RAILROAD GAZETTE

FRIDAY. JUNE 24.

NEWS OF THE WEEK.

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

Elections.—Dayton, Fort Wayne & Chicago, F. B. Loomis, President.—Hope & Shreveport, J. F. West, President.—Mobile & Navy Cove Harbor, John A. McNulta, President.—Ohio Valley, P. G. Kelsey, President.—Portland & Willamette Valey, C. T. Crocker, President.—St. Louis, Alton & Springfield, Delos R. Haynes, President.—Syracuse, Ontario & New York, George H. Graves, Superintendent.—Terre Haute & Indianapolis, Charles Neilson, General Superintendent.—Chicago, Santa Fe & California, C. W. Smith, General Manager.

New Companies Organized.—Atchison Belt Line is incorporated in Kansas.—Big Sandy, Tug River & Twelve Pole is incorporated in West Virginia.—Chicago, Kansas & Arkansas incorporated in Kansas.—Crete, Milford & Western files articles of incorporation in Nebraska.—Equitable Transportation Co. obtains charter in Illinois.—Havana & Quincy files articles in Illinois.—Nebraska, Smoky Valley & Southern obtains charter in Kansas.—Oakland & San Joaquin files articles in California.—Pittsburgh, Baxter Springs & Galveston obtains charter in Kansas.—Southern Ontario Pacific is incorporated in Ontario.

Changes and Extensions.—*Arkansas:* Texarkana & Northern will be extended to Fort Smith.—*California:* Santa Rosa, Sebastopol & Green Valley completes survey.—*Colorado:* Denver & Rio Grande will build 160 miles of new road and change old road to standard gauge.—*Dakota:* St. Paul, Minneapolis & Manitoba has track laid beyond Fort Buford.—*Georgia:* Work begins on the Birmingham Atlantic & Air Line at Savannah.—*Illnois:* St. Louis & Chicago let contract for 75 miles of road. *New York:* Port Jervis, Monticello & New York will build 30 miles of road from Port Jervis.—*Ohio:* Louisville, Cincinnati & Dayton is completed from Hamilton to Middletown.—*Ontario:* Grand Trunk will build 15 miles of new road.

Leases and Sales.—Old Colony takes possession of the Hanover Branch on July 1.—Toledo, Cincinnati & Southern is ordered sold by the Court.—West Jersey buys the Anglesea road.

Traffic.—Anthracite coal shipments for the week ending June 18 show a decrease of 0.7 per cent., as compared with corresponding period last year; bituminous shipments show increase of 29.4 per cent.; coke, for week ending June 11 shows decrease of 84.6 per cent.—Cotton receipts, interior markets, for week ending June 17, show a decrease of 80.3 per cent., as compared with corresponding period last year; shipments show a decrease of 80.3 per cent.; seaport receipts show decrease of 85.7 per cent.; exports a decrease of 73.3 per cent.; cotton in sight is less than at same date last year by 31.9 per cent.

Miscellaneous.—Dayton, Fort Wayne & Chicago is the consolidation of the Dayton & Ironton and the Dayton & Chicago.—Wisconsin Central files articles, bringing all its roads under one name.

Contributions.

Mississippi River Improvement.

MOBERLY, Mo., May 25, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

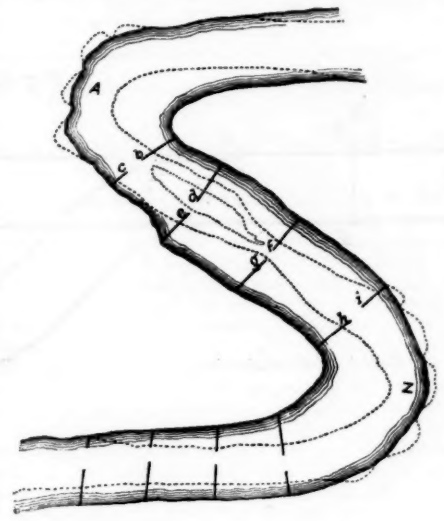
Having read the editorials in your issues of April 22 and 29 on the "Improvement of the Mississippi River," with very great interest, and having had considerable experience in controlling the Missouri River between Kansas City and St. Charles, I desire to discuss the question further, in the hope of learning more of the subject and possibly give a few practicable suggestions.

I agree with you that it is useless to try to straighten the river, but I think the desired end of good deep navigable water at all stages *can* be attained without the expenditure of fabulous sums of money, but with simply liberal aid from the government. I think the results attained by the present methods of carrying on the improvements are very far short of what might be expected from the expenditure of such large sums of money; at least such is the case with those portions of the work which have come under my observation. I don't know of a single piece of work attempted by the government engineers on the Missouri River between Nebraska City and St. Charles which has proved a success, although they have all cost from $20,000 to $200,000 each. This is ascribed by many people, including the government engineers, to the "treachery" of the Missouri River; but I ascribe it to the method they use, because in spite of the treachery of the Missouri River there is not a piece of work which this company has undertaken to prevent the river from cutting out their track, but what *has* proved successful and accomplished what was expected of it. I refer only to the work of the last two and a half years, as previous to that time the company never commenced their protection till high water was actually cutting them out, and the work done in those times of excitement is never fully successful and always costs three times as much as work done in proper season.

I accept and agree with your statement that we have plenty of water in the bends, and the only problem there is to keep the convex bank from continually cutting, thereby in the course of time completely changing the relative positions of the bends and "crossings," which would, of course, render the great works in the crossings or shoals more or less futile and inoperative. My method of maintaining the bends is very single and cheap, as I will explain further on, and proceed now to discuss the main issue, viz., the deepening and maintaining the channel in the shoals on the crossings.

You state in your article that, with the prevailing widths for high water of from 3,000 to 4,500 ft. and with the present curves, it is practically impossible to avoid the small depths. Now there is where I take issue with you. I think those shoal crossings can be deepened and confined at comparatively small expense considering the immense advantage the work would be to the commercial interests of the people of the Mississippi Valley and the great West.

In explaining my method, which is on the same principle as the Eads jetties, only more economical because the conditions are more favorable, I will have recourse to the attached diagram. Let *A Z* represent two consecutive bends in the river. These bends are usually three to five miles around, and for that distance there is always good deep water. The crossing between the bends is generally about the same length or a little less if you include all the deep channel as bend and all the shallow bar as crossing. Now, I propose to take the times of low or medium low water and build sills or dikes out from the high water shores opposite one another, so that their ends shall come within 1,000 to 2,000 ft. of one another. These sills are represented on the sketch by letters *b*, *c*, *d*, *e*, *f*, etc. The centre line of channel between the opposite sills should be as near in the tangent line of the centres of gravity of the currents in the bends as practicable. As you will see by the diagram, and as you well know, at medium stage of water a large part of the high-water channel is dry sand bar. Out of a total width of 7,000 ft. of high channel an average of 3,000 or 4,000 ft. of it is high sand bar either on one side or the other, or both. That portion on the bar could be built very cheaply with brush sides and top and earth centre; and the portions under water would also be comparatively cheap, for the water would be shallow and current slow. The mats we build for that purpose are not woven with wire as the government weaves them, but are simply two layers of brush fascines laid endwise of each other on a frame of cottonwood, or other cheap lumber held together by oak pins and wedges and spikes. These are found sufficiently strong to resist, in sinking, a current of 6 to 10 miles an hour, such as is produced by jutting out a dike into 35 ft. of water in the bends. I would lay such mats to form a sill, commencing at the water line on the bars and building out two mats thick till the ends of sills were as near 1,000 ft. apart as possible. Then from the water line back to high bank I would first lay one tier of mats 64 ft. wide, then lay the brush fascines butts outward, so they would be about 60 ft. from out to out, and scrape sand into the space between and on top of the boughs of the brush, and thus form a dike with the proper longitudinal slope to give ample room for the high water channel and at the same time confine it. The side slopes of the dike would be about 1½ to 1, and the width of dike on top about 20 ft. A mat that would be built on top and well weighted with stone to form a sort of roof. Assuming the high banks to be 20 ft. above the water line, at which work was commenced, the average height of the high-water dike would be, say 12 ft., and average width of dirt portion 30 ft., not counting space occupied by fascines, making about 14 yards earth per foot, which would cost not more than $3 per running foot of dike. Then the brush part of dike would cost on a basis of one mat 64 ft. wide, one 20 ft. wide and the brush walls about 16 ft. wide each, charging $3 per cord of brush in fascines, $10.00 per running foot, and about 1 yard of stone per foot would weight the thing down together with the sand mixed with the brush; making a total of $15 per foot of dike for that portion on the dry bar averaging 12 ft. higher than the bar. That portion under water would cost about $15 or $20 per foot, using the figures obtained from our own work. Taking 4,000 ft. of sills as on dry bar and 2,000 ft. under water, the cost of sill and dike would be about $100,000.



These sills could be placed about one mile apart, or, at the least, three-quarters of a mile apart in the crossings.

My experience has been that dikes 250 to 300 ft. long on sand bottom in water 35 to 40 ft. deep at medium low stage, placed on the convex shore of the bends, one-half mile apart, will protect the shore from erosion and cause a very deep channel beyond the ends of dikes. And therefore I think these sills and dikes placed one mile apart would be sufficient to maintain a narrow channel at low water 15 ft. to Vicksburg, 12 ft. to Cairo, 10 ft. to St. Louis, 8 ft. to Keokuk and 5 ft. to St. Paul, which are the desirable, but in your opinion, unattainable results.

Then in the bends I would not build any dikes, but let the river itself build them by sinking one or two mats at prominent points around the bend about one-half mile apart and ripraping the bank, and then as the current cut the shore away, I would continue ripraping both sides of the point till it formed a dike about 400 ft. long from the shore line, as shown by dotted lines on sketch around the bends. Such work would not cost more than $5,000 per mile of river line.

Now, assuming that the miles in the bends are equal to the miles in the crossings, we have an average expense of $52,500 per mile of river, or $105,000,000 for 2,000 miles, which would take it up to St. Paul nearly.

This work should be carried on all from below, starting at the lowest point of difficult and uncertain navigation and improving that first and working thence up stream always. It is in my opinion the height of folly to work on all portions of such a stream at once, or to try to improve the upper portions before the lower portions. By my method, if the lower portion was diked all the work above it would simply serve to make the lower portions still deeper, for as the channel above was narrowed it would become swifter and keep the lower portions open better than formerly, because after the work is done, as suggested, the channel can only take the one course between the ends of the sills, and it cannot cut where the sills are nor between them seriously.

I think $200,000,000 would be cheap if the government could complete the improvements to St. Paul for that amount of money; but it can never be done by the methods now followed. The only practicable method is to do it by contract, as the jetties were done. You might say no one would undertake the contract, and probably that is so, for capitalists would be shy of risking their money on what appears such an uncertainty; but I would undertake to do it for that amount of money and accept half pay as work progressed till it was completed. In these times of treasury surplus it would not hurt the government to appropriate $20,000,000 a year for the work and let the contract for ten years.

C. H. TALMAGE,
Resident Engineer the Wabash Western Railway Co.

The Staff System.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In reference to Mr. Anderson's letter in the *Railroad Gazette* of May 13:

Question 1.—When the staff does happen to be at the wrong terminal station for "opening the line," there is no alternative but to send it back to the other terminal station either by a man walking, or riding or driving. But by a judicious use of the "train ticket" this occurrence should be rare. It may, however, arise from a want of forethought on the part of a terminal station master, also by a special or "wild cat" train turning up without notice, or in the case of an accident.

Question 2.—The precedence of trains to get the right of road is not interfered with by the staff system; if the station master has fair notice of trains approaching him he can hold over a slow train and send on an express with a train ticket However, say at station A, the station master must know the last train to carry the staff from A to B in time, for a train fixed to run from B to A. A stupid man may create a block or a muddle, but it is placed largely beyond his power to produce an accident.

E. B. IVATTS.

[Although Mr. Ivatts does not give any satisfactory account of experience as we could wish he would, he hows the case to be as might be expected; the questions of safety and of convenience are distinct and separate, and the latter in England, as well as everywhere else, requires brains for its accomplishment. To make everything run smoothly there must be care and forethought in any case. Of course the sensible thing to do when it is desired to start a train and the staff is not available is to get leave by telegraph from the man who holds it, and a system with provision for this would seem to be practicable. It is to be remembered that the station master really has large authority and discretion (after having informed himself by wire), and in considering the staff system in connection with American roads we have had in mind chiefly those short divisions and branches where the station master (or the conductor) really has considerable authority already.—EDITOR RAILROAD GAZETTE.]

Automatic Signals on the Boston & Albany.

This road has had a larger experience with electric signals than almost any other in the country. A large portion of the road is now equipped with such signals, and additions to the plant are constantly being made. A brief description of the apparatus employed will be followed by some account of its practical working and the results obtained.

The road has double track throughout its whole length, except the first ten miles, where there are four tracks. This short distance and some other detached portions of the road have continuous overlapping blocks; the remaining applications (with a single exception) are "station blocks" so-called; that is, there is a signal each side of the station about one-half

mile distant, which is connected with every switch in the track to which the signal belongs, and the function of which is to protect a train while standing at a station or switching. As traffic increases, or for other reasons it becomes advisable so to do, these applications can be made parts of a system of continuous blocks with no other change than simply overlapping the sections.

For the first mile from Boston all trains are of the same class and run on the same tracks. After that they diverge, express passenger and freight trains running westward on track No. 1 and eastward on track No. 2; while suburban passenger trains travel westward on track No. 3 and eastward on No. 4 for 10 miles, to the end of the four-track section. A large part of the suburban trains go no farther, and beyond this point all trains again run on two tracks.

In the first mile the signals are about ¼ mile apart, then ½ mile for two miles more (which includes a large yard for outgoing and another for incoming freight trains, besides two important junctions), and then about a mile apart as far as the continuous blocks extend.

The larger part of the road is equipped with the rail circuit clockwork signals of the Union Switch and Signal Co. The first applications of this signal were made in 1882, when 6 blocks were put up as an experiment. The remainder of the road which has signals at all is furnished with the old style Hall duplex signals, very much inferior in efficiency and simplicity to those in use on the New York, New Haven & Hartford.

LINE BLOCK SIGNALS WITH RAIL CIRCUITS.

The road is divided into sections of varying lengths according to the amount of traffic or local circumstances, as above mentioned, each of which sections has a signal at the beginning (operated by clockwork and a weight), which is set to the position indicating danger whenever a train enters the section from any point, and restored to that indicating safety when the train leaves the section. Each section is electrically insulated from those before and behind it. At the end farthest from the signal is an electric battery giving a constant current, which is connected to the track, one pole to each rail; at the signal end of the section, the coils of a relay are connected to the rails in like manner, so that there is a constant flow of electricity from the battery through one line of rails to the relay, thence through its coils to the other line of rails, thence by these rails back to the battery. This relay controls the local circuit (so-called) of another battery connected to an electro-magnet in the signal which governs the motion of the clockwork operating it.

Fig. 1 shows the track clear, relay *R* holding the local circuit through *S* closed.

The successful operation of signals by means of rail circuits requires that the electromotive force (or pressure, as it may be considered) of the battery connected to the rails shall be so small that there will be only slight leakage from the rails even in wet weather. It is found advisable, therefore, to include in the track circuit only the coils of a relay of low resistance, and make this relay open and close the circuit for another battery of any size desired, which shall operate the signal mechanism. There are then two electric circuits for each signal; one through the rails controlling another through the signal. Both circuits are normally closed; that is, there is a constant flow of electricity through the whole length of each. The clockwork is so constructed that when the current is passing through the magnet the signal is held in the position of "all clear" or "safety." When this is interrupted, the signal makes one-fourth of a revolution to the position indicating "danger" or "stop."

When a train enters the section the current in the rails takes the path of least resistance through the wheels of the train instead of the relay magnet. The armature of this magnet then falls off and opens the circuit of the battery controlling the signal, and this takes the "danger" position as long as the section is occupied. When the rear of the train passes out of the section the circuits are again closed and the signal shows clear; but if so much as a pair of wheels remains in any portion of the section the signal will continue to show danger until the obstruction is removed. The same effect is produced whenever, for any cause, either circuit is interrupted—if, for instance, the battery fails, or the wires are broken, or the clockwork is run down, the signal shows "danger." If a rail in the track is broken, and the parts separated by so much as $\frac{1}{100}$ of an inch, the signal will be at danger. Many instances of this kind have occurred, and not a few where the indication was most timely. Indeed the use of automatic signals has often discovered broken rails which might have remained in the track a long time without such displacement of parts as would have rendered them liable to detection by the ordinary methods of inspection.

To make perfect electrical connection between the rails, a wire extends past each joint, the ends of which are connected to the two rails by a tight-fitting pin in a hole drilled in the flange of the rail. While rails are new and fish-plates tightly screwed up, this is not absolutely needed, but as soon as they begin to rust, there is trouble if the rails be not connected by the wires. Signals have worked for several months with an unwired track, but ordinarily they will do so only for a few weeks, even if rails and fish-plates be perfectly new.

Figs. 2 and 3 show the circuit breakers connected with each switch, and the wire connections by which the rails of side tracks are included in the track circuit, for the purpose of keeping signals at "danger" until trains entering the side-track are fully clear of the main line. In fig. 3, points *X* and *Y* are connected by the curved flat brass which is held against them by a spring, and the two rails are thus electrically connected, the same as when a pair of wheels is upon them. In fig. 2 the switch rail *T* having been withdrawn from the main track rail has pushed the brass connections away from *X* and *Y*, breaking the connection between the opposite rails.*

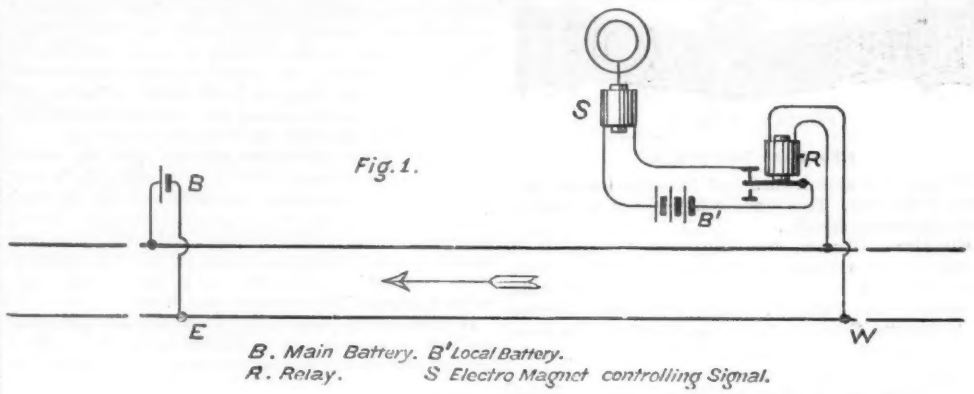


Fig. 1.

B. Main Battery. B' Local Battery.
R. Relay. S Electro Magnet controlling Signal.

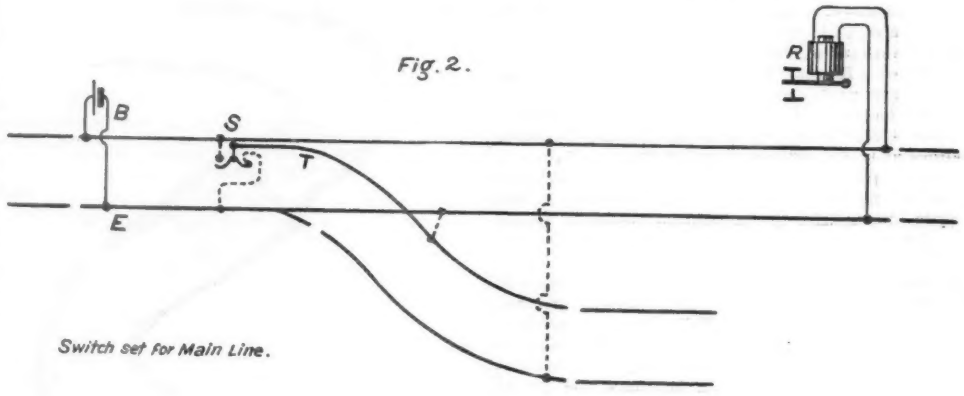


Fig. 2.

Switch set for Main Line.

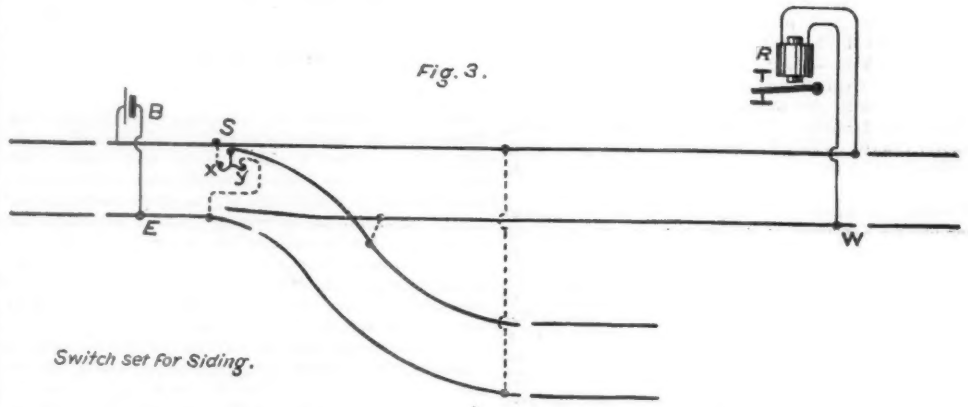


Fig. 3.

Switch set for Siding.

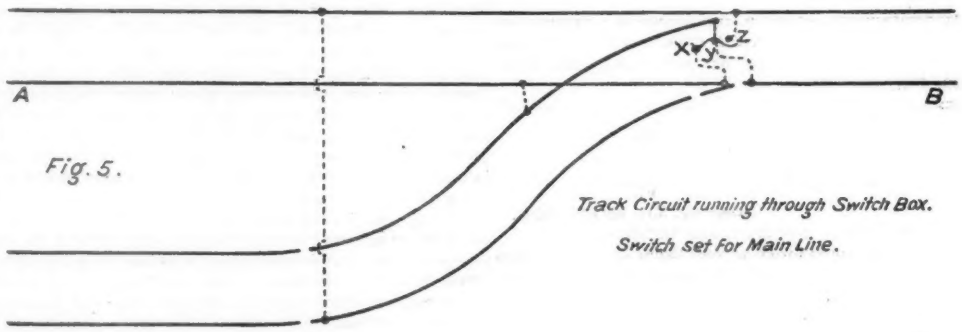


Fig. 5.

Track Circuit running through Switch Box.

Switch set for Main Line.

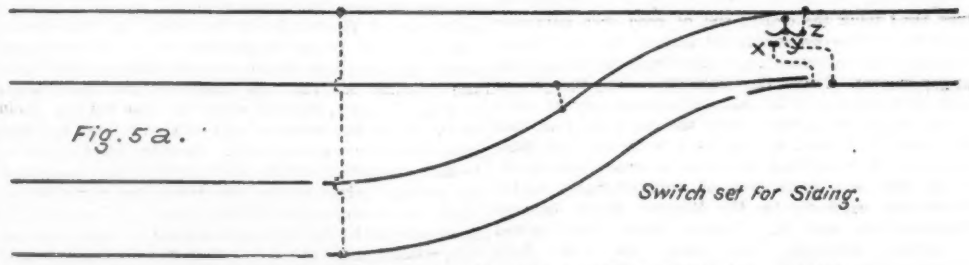


Fig. 5a.

Switch set for Siding.

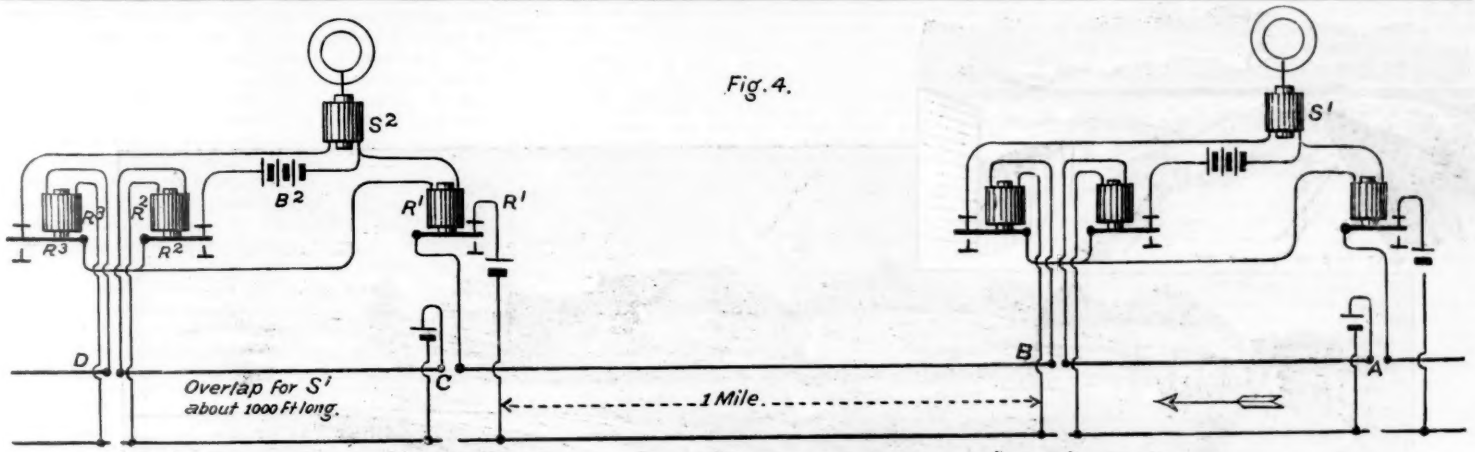
TRACK CIRCUITS FOR AUTOMATIC SIGNALS ON THE BOSTON & ALBANY.

When the block signals are continuous, that is, with no spaces between the sections, the safety of trains following each other at short intervals is very greatly increased by making the sections *overlap* each other. This causes a signal to remain at danger until the train has passed a certain distance (usually about 1,000 ft.) beyond the next signal. While the train is running this short distance there are *two* red signals behind it, one at the beginning of the section where the train is, and the other at the beginning of the preceding section.

The arrangement of circuits which accomplishes this is shown in fig. 4, which assumes the block to be one mile in length. The principal track circuit for the signal S^1 passes through the armature of a relay R^1; the coils of this relay are in a wire circuit connected with the battery B^2, which is controlled by a relay R^2 placed at the end of the overlap. The coils of this last relay are connected to the rails of the overlap. It will be seen that a train on any portion of this short section will operate the relay R^2 and consequently R^1, and set both signals. Hence, so long as an en-

* In figs. 2 and 3, *B* is the battery at one end of the block section, and *R* the relay controlling the signal at the other end. The switch *S* (or any number of switches) may be at any point between these two.

Fig. 4.



TRACK CIRCUITS FOR AUTOMATIC SIGNALS ON THE BOSTON & ALBANY.

gineman does not pass a red signal he can never approach a preceding train nearer than the length of the overlap.*

Signals are placed a short distance (usually about 200 ft.) beyond the beginning of the section, in order that an engineer may see the signal operate for his train. Should it fail to do so, he is to stop, the same as for a danger signal, and proceed only as the way is known to be clear. The engineer of every train stopped by a signal must without delay report the stop and the cause *if known* (on blank cards provided for the purpose) as, for instance, a preceding train in section or an open switch. If the cause be not apparent to the engineer, he simply reports "cause not known," and it is put in the hands of a repairman to investigate. When the latter has ascertained the cause (for instance, a broken rail, failure of battery, derangement of some part of the apparatus or other cause not at first apparent) he returns the card with his explanation indorsed thereon. If *he* cannot find out the cause, he returns the card with that statement, and it is usually never ascertained. There is a small fraction of one per cent. of such stops at signals. It is quite certain that some of these are due to previous trains, open switches or other legitimate causes, but in the absence of positive proof they are not so classified. Sometimes employés needlessly cause stops of trains at signals, and to save themselves the consequences carefully conceal the fact, which is not always afterwards discovered, and when this is the case such stops have to be reported "cause unknown." A careful record is kept of all stops and their causes, and every month a debit and credit account is made up of the operation of the signals on each division of the road, which shows at a glance what proportion of stops is due to neglect of employés, defective apparatus, unavoidable causes, etc., as well as all legitimate stops.

The only stops credited to the system are those due to (1) previous trains in section, (2) open switches, (3) broken rails, (4) repairing track, (5) [sometimes] using single track, (6) cars left on turnouts too near the main track. Lost motion in switches, broken track wires or any other failure of the track circuit is usually charged to the neglect of trackmen; those due to failure of batteries, corrosion of apparatus and certain other derangements to neglect of signalmen, so that the blame may be placed where it belongs. Employés are held to a strict account for all avoidable stops caused by them, and the ratio has been reduced to one surprisingly small. To the debit side of the account is charged all such stops as are caused by defective construction of any part of the apparatus. The number of these has heretofore been unreasonably large. First-class mechanical construction costs but little, if any, more than such as would not pass inspection in any good machine shop, and gives immeasurably better satisfaction in service. There remain a certain number of stops due to "unknown" causes, and certain other stops due to climatic conditions, unavoidable accidents to the apparatus, derailments, lightning, etc., which are grouped by themselves under the head of "accidental." Longer experience will doubtless suggest ways in which the number of these may be diminished.

The selling agents for railroad signals are fond of asserting that, in their particular system, "it is impossible for a signal to show safety if danger exists." They rarely, if ever, make known that there are any weak points or loop-holes for failure in their systems, sometimes (it may charitably be assumed) because they do not know them, never having had any practical experience of their working except in a model room; but the severe tests of actual service, under all varieties of climate and temperature show that the perfect railroad signal has not yet been invented. In each system certain deficiencies, or failing cases, must be provided against in order that the signal may work regularly, or be used with safety.

The most dangerous error an automatic signal can mak is to show clear when a train is in the section. The Union signal is, perhaps, more free than any other from such failures, but they are by no means unknown. The cases which have come under my own observation have been due to (1) a failure of the track circuit relay to drop its armature when the current was shunted out of the magnet; (2) too much battery on the rail circuit; (3) crossed wires between the signal and overlap relay; (4) failure of the signal magnet to release the clockwork when the circuit was opened; or (5) the sticking of some mechanical part of the apparatus which should have moved freely. Of these the first is by far the most common except in ice and sleet storms; like the fourth, it is usually due to fixed magnetism in the cores or armature of the relay, and could be prevented by the use of better iron in their construction. The second cause is the fault of the signalman, and the third may also be. This last may be remedied by a different arrangement of circuits, which the Boston & Albany will adopt in all new work. The fifth may, or may not, be the signalman's fault. A rainstorm sharply followed by freezing weather will stick every signal in an hour, in the position it happens to be at the time. A heavy fall of damp snow will sometimes (but rarely) do the same thing.

Another failing case of bad repute is when the signal stands clear with a switch open. This usually shows a faulty connection in the switch-box. There is no way (with the arrangement of circuits shown in figs. 2 and 3) to know beforehand whether opening the switch will set the signal. A far safer connection is shown in figs. 5 and 5a, where the current in the rails is made constantly to pass through the switch-box, when the switch is on the main line. The switch-box must be in good order or the current cannot pass. All the switch connections on the Boston & Albany are now being changed to this style.*

A multitude of causes may make a signal stand at "danger" when no train is in the section, or switch open. Any derangement of the apparatus (except the special ones enumerated above), or interruption of the rail circuit by displacement of the track or otherwise, will do this. Stops thus caused are principally a matter of annoyance and expense. They do not introduce an element of danger, except that, if very frequent, they would tend to make enginemen careless of the indications of the signal when it did warn of existing danger. Though there may be a considerable number of such stops in a month on some divisions of the road, it is found when account is taken of the number of trains running, that the ratio of failures to number of operations is very small.

THE HALL AUTOMATIC SIGNALS.

Of the Hall signals on the Boston & Albany, little needs to be said. They have none of the latest improvements which make that instrument a model of simplicity and careful construction, and make one wish all the mechanism he uses could be made with equal precision. They have open circuits through wires carried on poles, and give no indication of broken rails, parts of trains left in sections, or cars on turnouts left too near the switches, nor do they profess to do any of these things. The most serious errors they have ever made have been due to a train entering a section already occupied. Trains are sometimes obliged to do this, but must take certain precautions. When the first train passes out of the section it reverses the signal behind the second train, leaving it with no protection whatever. If now a *third* train enters the section, it does so with the assurance of a clear track, and may discover the second train when too late to make a safe stop. Collisions have resulted from circumstances of this kind.

The cost of operating each Union signal, including superintendence, was, during the year ending Oct. 1, 1886, about $75.69, or $6.31 per month. The cost of each Hall signal was, for the same period, $174.26, or $14.52 per month.

There are roads equipped with Union signals which claim to have fewer unnecessary stops per signal than the Boston & Albany, and to run their signals at less expense, but they have for the most part no overlapping sections (which very much increases the simplicity of their applications), their trains run at longer intervals, and in some cases the account of stops and their causes is not so carefully kept.

In conclusion, the results obtained, while not all that could be desired, are such as to lead to a large degree of confidence in rail circuit signals. In point of safety and reliability of indication they are a long way in advance of other systems, and the rail circuit is an absolutely essential feature of automatic line block signals, which propose safety as one of their characteristics.

GEO. W. BLODGETT.

* When a train is on the section *C D* relay R_2 is demagnetized, thus opening both the circuits through battery B_2; S_2 and S^1 then both show "danger." When a train is in the section beyond *D*, relay R_3 is demagnetized, holding S_2 to "danger." Signal S_2 stands 200 ft. from *C* and 800 ft. from *D*.

* The current in the rail *A B*, when the main track is unbroken, must normally pass through the points *X Y*; when the switch is moved, the connection between *X* and *Y* is broken and the opposite rails connected (as by a pair of wheels) through *Y* and *Z*.

An Artificial Earthquake.

(*For illustration see page* 416.)

The illustrations herewith do not show a region visited by earthquakes, nor are the cracks in the earth and the attitudes of the houses indicative of nature's freaks. They merely show what followed the forming of an earth embankment in a wide area of soft and spongy material. As the weight of the embankment increased, it settled and caused the meadow adjoining to pitch and roll, thereby rendering the foundation extremely "unlevel" and unstable.

Our pictures represent a point on the line of the Pennsylvania Railroad, one mile and a quarter from the Jersey City ferry, where there is a 10° curve, just west of which is a second one, in the reverse direction, of 6°. The road is being so far straightened as to require but two curves, each of 3°, thereby reducing the curvature nearly two-thirds in a distance of 2,400 feet. One of the accompanying drawings shows the location of the old line and the embankment for the new. Mt. Pleasant, a hill between the two lines, is being removed, and the rock which constitutes about ninety per cent. of the whole is broken up for ballast, while the earth serves as part of the fill. When leveled, this entire area will be used as a yard for passenger cars, and will contain a large round-house.

A peculiar feature attended the prosecution of this work. From the base of the hill east, or toward the river, the land was formerly a salt marsh, the soft black mud of which is from 40 to 60 ft. deep, and rests upon sand, gravel and clay. It was anticipated that the filling necessary for the road would create a disturbance in the land adjoining the embankment, and the adjacent property was therefore purchased by the company and the streets vacated. The company was led to take this course since it required the land for railroad purposes, and as it was more economical to buy and fill in than it would have been to build either retaining walls or trestle. As the embankment increased in height, the meadow to the north and east moved to such an extent that it became necessary to support the houses on First and Second streets upon cribs and jacks, and in some cases, as clearly illustrated in the drawing, to employ shoring. This entire tract will ultimately be filled in and occupied by the railroad. In every instance the movement of the ground was slow and regular, so that it was a comparatively easy work to prevent the houses from getting too far from the perpendicular.

Twenty-first Annual Meeting of the Master Car-Builders' Association.

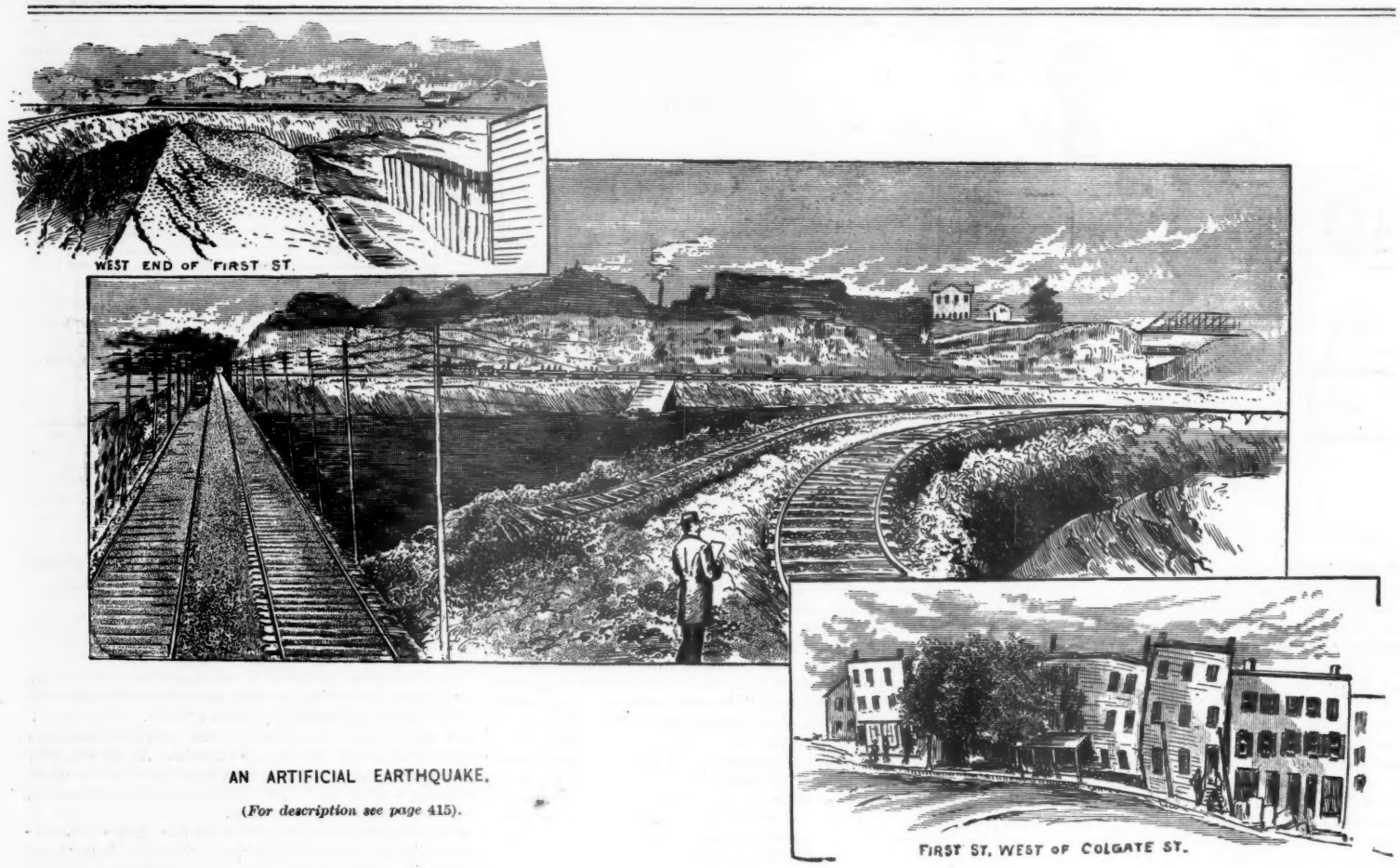
(*Continued.*)

After adjourning on Wednesday evening, as stated in our last issue, the convention met on Thursday morning, June 16. The first subject brought before the convention was the following report of the committee on standard appliances for the safety of trainmen. The report was read by Mr. Forney.

REPORT OF COMMITTEE ON STANDARD APPLIANCES.

* * * Within a few weeks of the date of the meeting of this annual convention, the third member of the committee had not heard from either of the two other members of the committee. As it seemed to him it would, or should, be a cause of regret if no report whatever was made on so important a subject, he determined to prepare a paper on his own responsibility in the very limited time which the duties of his official position left at his disposal. This paper or report is, therefore, the work of a minority of one. After it was written it was submitted to another member of the committee, so that it has the sanction of a majority of the committee. Owing to the haste with which it has been prepared, it does not assume to be the result of an exhaustive or adequate study of the subject. * * *

The last reports of the Railroad Commissioners of the states of Massachusetts, New York and Michigan show that during the year previous there were 217 railroad employés killed and 1,226 injured in these three states. From these same reports and from Poor's Manual we find that there were 4,856 locomotives in the railroads of these three states, and in the whole United States there were 25,937 locomotives. Now it may fairly be assumed that locomotives in other parts of the country do about the same amount of work that they do in the states named. If, then, 217 employés are killed and 1,226 injured while 4,856 locomotives are doing a year's work, it



AN ARTIFICIAL EARTHQUAKE.

(*For description see page* 415).

may be inferred by a deduction of the single rule of three, that while 25,937 locomotives in all parts of the country are doing their work, 1,426 employés are killed and 6,548 are injured. This, then indicates approximately the annual sacrifice of life and limb of railroad employés in this country. * * *

This is perhaps not an occasion for being pathetic, but it certainly is the duty of those who compose this association to do all in their power to lessen the risks to which those who operate railroads are exposed. With this end in view, let us inquire what are the chief causes to which the accidents are due :

INJURIES TO EMPLOYES.

STATE.	Coupling or uncoupling cars.		Train accidents.		Falling from train or engine.		Various causes.		Total.		Number of locomotives.
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	
Massac'setts.	2	105	8	18	17	38	36	50	63	211	1,445
New York	23	365	31	97	40	152	65	174	159	788	2,583
Michigan	11	104	3	21	16	37	16	65	45	227	828
Total.	35	574	42	136	73	227	117	289	267	1,226	4,856

Percentages of Totals.

	Killed. Per ct.	Injured. Per ct.
Coupling or uncoupling cars	13 1	46.8
Train accidents	15 7	11.1
Falling from trains or engines	27.4	18.5
Various causes	43.8	23.6
	100.0	100.0

This shows that nearly one-half of the injuries are from coupling cars, but that the percentage of fatal accidents from that cause is only 13.1, whereas 27.4 per cent., more than twice as many, are killed from falling from trains and engines, but only 18.5 per cent. of the injuries are due to that cause. The large number of employés killed and injured by coupling cars, and by falling from trains will, or should naturally lead the members of this Association to inquire how this mortality and mutilation may be reduced, as the construction of cars has much to do with the risks to which the employés are exposed. Public clamor and indignation at the great sacrifice of life and limb from coupling cars, has led to the inference that it would be very largely diminished if automatic couplers were generally adopted; and much of the time of this Association has of late years been devoted to the consideration and investigation of the merits of various automatic couplers. Laws compelling the adoption of automatic couplers have been hastily enacted in various states, apparently without serious consideration or investigation of the question whether their use would materially lessen the number of coupling accidents. Owing to the large number and variety of self-couplers which have been put into use of late years, the members of this Association should now be able to know whether they lessen or increase the danger to employés.

The important question whether the risk and danger in coupling cars would not be reduced more by improvement and uniformity of non-automatic draw-gear, than by the adoption of a variety of self-couplers or the attempt to adopt one or very few kinds, is worthy of consideration and discussion by this Association. Many experienced railroad men are of the opinion that automatic couplers will not reduce the danger and the number of accidents from coupling cars. There can be no doubt that the form and construction of non-automatic draw-gear can be improved and reduced to uniformity, and that if this was done and if the standards for their height and for the dimensions for dead-blocks recommended by this Association were generally adopted, and if obvious safe-guards, such as handles on the ends of cars, were generally provided, that coupling cars would be much less dangerous than it is now. The difficulties in the way of the adoption and the use of any one or even a few kinds of couplers are so great as to appear to be almost insurmountable at present. There are so many conflicting interests arrayed against each other, that at present it seems hopeless to reconcile them, and even if there were no such conflict, it does not seem that any self-couplers which could be selected would be sure to lessen the risk of coupling cars, whereas it is certain that the improvement and reduction to uniformity of non-automatic draw-gear would make the occupation of the brakeman less dangerous than it now is.

Furthermore, it is very desirable that the draw-gear and the ends of cars should be uniform in construction, if an automatic coupler is adopted, so that if the efforts of this association should be directed to the improvement of the non-automatic draw-gear, it would first be certain to diminish the risk of coupling cars, and next such a change will make the adoption of automatic couplers easier in the future.

Regarding accidents caused by trainmen falling from trains, the following remarks of a highly esteemed member of this association, Mr. J. W. Marden, may be quoted. In a letter dated June 11 he says:

"I would urge upon all members the importance of having proper appliances on all cars for the protection of trainmen and having them kept in good condition. We were receiving so many cars with running boards defective, ladder rounds, grab-irons, steps, etc., gone, that I sent out a circular letter to different roads asking them if they would approve bills for repairs to such appliances; not that it was according to the rules, but that it was what I considered a proper charge to be made.

"We have repaired running boards, grab-irons, handles, etc., to as many as 300 foreign cars a month at North Adams, which shows that these appliances are not watched and repaired as they should be. I am free to admit that our own cars are not up to the standard that they should be, and yet we are making every effort to bring them up, and would be glad to approve any bills for repairs of the safety appliances for trainmen."

Mr. Marden's remarks indicate that what is needed is more rigid inspection of cars. The author of this paper is not prepared to recommend any improvement in the appliances for the protection of trainmen from this class of accidents referred to, but he has no doubt that the experience of the members of this Association would enable them to point out the defects and suggest improvements in the steps, handles, railings, etc., of the cars now in use. There seems to be no good reason why a standard should not be adopted for the construction, location and proportion of such parts of cars. If uniformity could be secured there certainly would be less danger to trainmen than there is now, when nearly every car in a train is different from every other car. * * *

M. N. FORNEY,
JOHN KIRBY.

At its conclusion Mr. McIlwain moved that the subject be continued and the Committee be instructed to make a definite report as to the appliances they would recommend at the next annual convention.

Mr. F. D. ADAMS (Boston & Albany) urged that the subject be taken up at once without any farther delay. The Committee would have no farther information next year and the subject would again be postponed, while the loss of life and injuries to trainmen would go on unchecked. He believed that there was no great need of new appliances, but it was very necessary that the present appliances should be kept in good order. Our present appliances are allowed to go to ruin and cars are permitted to run in a dangerous state in order that the freight shall not be delayed. If however, cars were kept in better repair, there would be fewer delays and fewer cases of loaded cars having to be stopped on account of very serious defects. He regretted the recent decision on the car-coupler question, as he believed it would not be conducive to the safety of trainmen. The question of couplers was considered at a conference of general managers and master car-builders of New England roads, and it was agreed that the general use of the link and pin throughout the country would make the adoption of another type of coupler dangerous. If all cars were equipped with any one type of common link and pin coupler, with the Safford for instance, he believed the loss of life would be less than with the present condition of affairs. It was cruel to find the way in which ladder and grab irons were fastened, both in new cars built by contractors and in old cars repaired at railroad shops. Spikes that would pull out at the slightest touch were used, instead of proper bolts or lag screws.

Mr. M. N. FORNEY considered that the adoption of one type of coupler would diminish, and the use of a diversity of types would increase, the loss of life. An expression of the company on this floor would have considerable influence in determining this question.

Mr. J. W. CLOUD (New York, Lake Erie & Western) considered that all practical men were aware that a large proportion of the lives lost from falling off trains was due to the jerks experienced in running through sags. It had been conclusively proved that the use of the close coupler would lessen these jerks, and, therefore, save much of the loss of life from falling off cars, in addition to the saving effected in the loss of life in actual coupling. The more general use of the extended running board would also save the lives of the men who fall in stepping from one car to another, but accidents from this cause would also be diminished by the use of the tight coupler, which would diminish the shock. The jerks inseparable from loose coupling are responsible for a great deal of the loss of life from this cause.

Mr. ADAMS recognized the fact that men were thrown from the roof of a car by jerks, but on the Boston & Albany the great majority fell from defective ladders, grab-irons and running-boards. Even the extended running-board introduced fresh dangers if not properly made and secured and kept in order. But if we report these things on foreign cars, the owners complain in the strongest possible manner.

Mr. RHODES responded to the request for a narration of actual experience. He had had that experience at the Burlington brake trials. The cars there were all new and properly equipped, but they had had a lively experience; two men were knocked off the cars in last year's trials and this year one man was knocked down in the caboose and another fell between the cars but caught a brake-shaft. We must endeavor to get rid of jerks, for, as shown at Burlington, they are dangerous even with appliances in good order.

Mr. JACOB JOHANN, President of the Master Mechanics' Association, considered that the defective state of the safety appliances on cars was greatly due to the system of using "defect cards." Carding simply means saving trouble to the inspectors at junction points. Many cars now running with cards should not be allowed to run at all. Something definite should be done about the coupler question. A close coupled train that an engine can handle easily is the proper train, and not a train at which an engine has to snatch in order to get it to start. (Loud applause.) The absence of slack, vertical plane couplers, and cars in good order are our three great requisites.

Mr. T. A. BISSELL (New York Central Sleeping-car Company) thought that many accidents were due to the rough

handling of trains by engineers. With some engineers, trains break in two continually, while with other men this was very rarely the case. There was also much difference in cars, in the height, construction and strength of draw-head. The coupler question was now in a position to be voted on, and he hoped that it would be decided as soon as possible. If they were able to arrive at a decision within a month, all railroads would know whether we were to have universally the Janney type, or others as well.

Mr. JOHN KIRBY (Lake Shore & Michigan Southern) had found that the different heights and varying construction of draw-bars had a great influence on the loss of life. The standards agreed on were not adhered to. He had examined one car some time ago, on which a man was killed in coupling, and found that the center of the draw-head was 36 in. from the top of the rail, or 3 in. above the standard. If this fact were brought before a jury, the judge might ask some very awkward questions. While jerks cause loss of life, there are also other causes. The construction of our freight-car roofs is such that once a man loses his footing, when the roof is covered with ice or from any other circumstance not connected with jerks, there is nothing to save him. A guard should be placed running along the roof near the edge, and this should be 7 or 8 in. high. This would prevent a man falling off, and would enable him to hold on and regain his footing.

Mr. FORNEY pointed out that in the report it was stated that 35 were killed and 574 injured from coupling accidents, but it was by no means certain that this report was correct, and it is highly probable that many of those returned as injured died within a few days.

Mr. ADAMS asked what the committee recommended, and if they could not make some definite suggestion, instead of postponing the whole question for another year.

After some further discussion the report was accepted and Mr. MCILWAIN'S motion was carried.

Mr. T. SUTHERLAND (Chicago & Grand Trunk) then submitted the following report on standard draw-gear.

REPORT ON STANDARD DRAW-GEAR.

Your Committee on Standard Draw-gear for Non-automatic couplers beg leave to report that they sent out over one hundred circular cards to the leading members of the Association, asking for opinions on the subject, together with what suggestions they might offer. To our solicitations we had the honor of receiving replies from six members—not a very encouraging state of affairs.

We herewith attach blue prints and tracing, showing the standard attachments on the Chicago, Burlington & Quincy, Central Vermont, Grand Trunk, Chicago & Grand Trunk, Lake Shore & Michigan Southern, and Chicago & Eastern Illinois. They are what is termed the pocket draw-bar, and which in our opinion stands for safety and durability in wear and tear unrivaled to-day. But at the same time I would call particular attention to the plans adopted by J. Kirby (Lake Shore & Michigan Southern). The thrust does not bear against the body bolster, but against continuous timbers, the butting pieces being 5×5¼ in. extending from the cross tie timber to 11 in. forward of the body bolster, passing between the bolster irons. In order to guard against shrinkage of timber and consequent pushing up of bolster, he has inserted gas-pipe thimbles, going through the butting pieces, the ¾-in. bolts going through thimbles, which also holds the centre plates on. A casting is also used in addition to thimbles, thus preventing the breaking of centre plates by bolster getting out of line, ⅞-in. bolts are used through end of butting pieces, floor timbers and another piece. This is done to stiffen the bottom of bolster and prevent if possible the breaking off at the bolster. The draft is not on the bolster, but continuous. Mr. J. Kirby also uses two springs abreast, both of which are used for pushing and pulling. With heavy cars and still heavier loads this extra cushion seems indispensable, thus preventing the metals coming together, which is the great source of damage to draw-bar attachments. So long as there is an efficient cushion little damage can be done. We would especially recommend the consideration of this form of attachment to the consideration of the members of this Association. All of which is respectfully submitted.

THOMAS SUTHERLAND.

Mr. JOHANN considered that the proper construction of draw-gear was a very important question. The repairs of draw-gear amounted to 70 per cent. of all car repairs. The constant concussion was the main cause of the frequent repairs required. The strength of the present draw-timbers was quite inadequate. They should measure at least 5 in., and bolts 1 in. in diameter should be used. He also placed an additional timber running back to the bolster and through timbers between the bolsters, as used by the President of the Association. He also found considerable advantage in using a longer spring than was usual. A 6 in. spring was too short; he used a 10-in. spring compressed ½ in.; he also used strong end-sills measuring 9 in. The ends of cars were not at present made sufficiently strong for the heavy loads now carried. He made his end posts 4 × 6 and struts 4 × 4; he also used two girts and ceiled the end of the cars inside and out.

Mr. WALL moved that the subject be continued, the report accepted and that the Committee be instructed to prepare plans and be increased.

Mr. KIRBY urged that in buffing a spring cushion is necessary, and that two springs placed side by side, as had been used by him since 1877, was superior to the usual method of using only one spring. The smaller the bars of steel the better the quality, and by using two sprngs made of small bars he had a more elastic and durable spring than by using one spring made of steel of greater diameter.

Mr. ADAMS moved that Mr. Kirby's plan be submitted to letter ballot for adoption by the Association. The motion was carried by 33 to 18.

Mr. WILLIAM FORSYTH then read a report on standard sizes of lumber for freight cars.

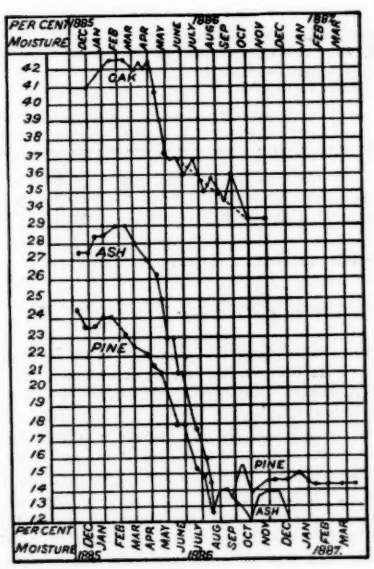
REPORT OF COMMITTEE ON STANDARD SIZES OF LUMBER FOR FREIGHT CARS.

In recommending a few standard sizes of lumber for the principal members of freight car frames, the committee does not expect to change existing dimensions on many of the larger roads. Its principal object is to present to the railroad public a bill of material which this Association can recommend to new roads having no adopted standard, and to other roads which are about to change from 30,000 or 40,000 pounds capacity to a car of larger capacity. It is the hope of the Committee, therefore, that the larger roads having standard sizes which they do not intend to change, will not oppose a measure which will do them no harm in the matter of car interchange, and may do others much good. The principal advantage which railroad companies would derive from uniform sizes of car lumber is the use of dry, seasoned lumber on contract cars.

By far the largest number of freight cars are now built by contract in the individual shops. What cars are built by the railroad companies in their own shops the lumber is taken from their own yard where the standard sizes may be kept on hand several years, and when used it is thoroughly seasoned. With the present diversity of sizes for the frames of cars for the different roads, it is almost impossible for the contract shops to keep in stock such a variety of lumber as will suit any order they may get. The result is that in most cases the lumber is not bought until the order is secured for cars, and it frequently happens that it is not *sawed* until that time. It is not an uncommon practice to build cars from lumber which a month before was in the mill pond in the form of logs. The evil effect of this practice is well known to car-builders, and it is undoubtedly the worst feature of contract cars. As the lumber dries and shrinks in the car the whole frame becomes loose, and the life of the car is materially reduced, not only by the working of loose joints, but by the premature decay of the lumber itself, when it is put together and painted before it is dry. It is a well known fact also that kiln dried lumber is not as strong as seasoned lumber, and it will rot quicker. If standard sizes were adopted the contract shops could keep on hand a sufficient stock of lumber to allow it to season one or two years, and the railroads could then obtain by contract a much better car then they usually do.

It is possible to specify a certain maximum amount of moisture in car lumber, and to obtain lumber to such specification, by measuring the amount of moisture in sample borings. The borings from about a cubic foot of wood are placed in a vial and weighed on a chemist's balance; they are then evaporated to dryness and weighed again. The per cent. of loss noted represents the water driven off. In this way the fluctuation of moisture during the process of seasoning has been obtained for oak, ash and pine, and it is shown in the diagram which accompanies this report.

Green oak, as received in the yard, contains 45 to 50 per cent. water, and after a year's seasoning it still contains over 30 per cent. Norway pine, from the mills, contains over 25 per cent. water, and a year's seasoning reduces it to 10 or 12 per cent. Pine should be seasoned at least one year, and oak two years to avoid excessive shrinkage and early decay. The amount of water in lumber may be taken as a direct measure of the length of time it has seasoned.



The majority of cars now building are 34 ft. long, so that one dimension of the long sills may be regarded as settled for the time. New equipment is also largely centering about a capacity of 50,000 lbs., and we recommend sizes suitable for that capacity. These sizes are not extra large for cars of 40,000 lbs. capacity, and they are sufficient for one of 60,000 lbs. The additional strength required for the latter can easily be obtained by the use of a deeper truss made of iron of larger diameter.

We therefore recommend the following bill of lumber for principal members of car body for 34-ft. box, stock and flat cars, capacities 40,000 lbs., 50,000 lbs. and 60,000 lbs.:

UNDER FRAME.

Six long sills, 5 × 9 in., finished Norway pine.
Two end sills, 7 × 9 in., finished oak.
Two cross ties, 4 × 9 in., finished oak.
Four draw timbers, 4½ × 7½ in., oak.
Flooring, 1¾ in. thick, 5 to 10 in. wide, Norway pine.

UPPER FRAME.

For the same cars as above, excepting flat cars:
Eight door and corner posts, 4 × 4½ in., finished oak.
Twenty-four pieces, intermediate posts and braces, 4 × 3 in., finished oak.
Two end plates, 3 × 12 in., finished oak.
Ten carlines, 1¾ × 9 in., finished oak.
Two side plates, 3 × 7 in., finished Norway pine.

We recommend also that the above sizes be submitted to the association for approval by letter ballot, as standards for freight car lumber.

WILLIAM FORSYTH, Chairman,
FRANK J. HECKER,
W. R. DAVENPORT. } Committee.

Mr. WALL moved that the report be accepted and the recommendation be carried into effect.

The Secretary then read the

REPORT OF THE COMMITTEE ON THE BEST FORM AND CONSTRUCTION FOR CAR ROOFS.

In offering their report on this subject for your consideration at this convention, your Committee would take occasion to express their regret that they are not able to present any very decisive conclusion in the matter they were appointed to report upon. They feel assured, however, that no weakness of purpose or remissness of action will be attributed to them if members will recall for a moment the nature of the subject under inquiry. In a large majority of cases we, as a body, are called on to deal with, and discuss points strictly within the limits of ascertained mechanical law; thus having some positive data to go upon and if necessary a "court of final appeal." But is it so in this case? They think not. The conclusion to be arrived at being necessarily dependent upon the wear and tear of years, they have had to abandon for the time their dry rules of logic and mathematical formula, to collect and condense the fruits of past experience.

Your Committee are glad to be able to report that they have received valuable assistance in their inquiries from most quarters, and in particular they would like to make special mention of the hearty co-operation extended to them by Mr. G. W. Rhodes, who very kindly furnished full copies of a report on this subject by a committee of master mechanics connected with the Chicago, Burlington & Quincy system. The replies received give information of eleven forms of roofs as follows: In metal, The Winslow, Chicago, National, Empire, Anchor, Grand Trunk sheet iron and tin. In composite, The Winslow, Asphalt and the Hutchins composition, and, bringing up the rear the old time double board and single board and battens, the latter especially for stock cars.

The first three, Winslow, Chicago and National may be classed as under roof, *i. e.*, the metal sheets are exposed to the inside of car and the top is covered with a single course of boards.

The others may be classed top roofs. A course of boards is laid on the carlines or purlins, and the metal sheets laid on top. A good type of the top sheet principle is the roof in use on the Grand Trunk system. It can be laid on top of first course of an old double board roof; or, when put on new, purlins need not be used, as the roof boards may be laid on the carlines, which stiffens the car very materially, and is less expensive. The iron is in sheets reaching across the car, and nailed to the facia. The joints are covered with rolled iron U ribs, gathering the edges of the sheet within the U, making a perfectly water-tight surface.

There is only one form of tin roof reported, and it is applied in the usual way. The use of plate tin for roofs is gradually becoming obsolete.

In order to bring the question most effectually before this convention for discussion, your Committee have thought best to mention some of the objections that have been made to the different forms of roofs.

From localities where baled hay and cotton, machinery, furniture, and similar bulky freight is handled, the metal roofs that are not protected on the under side very often become broken or punctured. Some of the lines running from very cold into very warm latitudes complain that the iron under roof sheets become coated with frost, and when cars pass into warm climate the frost melts and causes damage to freight. For the reasons above given, a metal roof with under protection, or the double board, would seem to be preferable. Then, again, objection is taken to the top metal roofs that they rust and corrode too fast, owing to exposure to the weather; also, that they are liable to wear and breakage by being run over, and punctured by the too generous use of the "bull punchers" of stockmen. The Winslow asphalt and Hutchins composition can scarcely yet be considered of age, but they have many good points; at any rate they are succeeding in making themselves known. But when the top course of boards begins to warp up under a hot southern sun, or, in turn, is subjected to a western water spout, the effects on the by this time (say ten years) hardened asphalt and other "compounds" may not be at all desirable. The double board roof which so many of us have stood by for so long, and which yet has so many friends, is at last beginning to lose ground, as a master car-builder in the Southwest very pointedly says, "cut nails" wouldn't hold it, then "wrought nails" were tried with the same result, and now we are trying to keep them down with screws and "barbed wire nails," "but all in vain." Another says, "The paint we have put on in ten years, to keep it from leaking, is as thick as the original roof itself." This, of course, is a mild exaggeration, but still it conveys a moral.

Your Committee think that in the foregoing will be found ample material for discussion, but they also believe they would only partly be fulfilling their duty did they not lay before the convention a brief statement of what appears to them the requisites for a good car roof. It is, then, their opinion that what is needed is a durable and substantial roof, that will last the life-time of the car, without continual repairs, and be free from leakage when the car is sent to the "bone yard;" a roof that will increase the life of a car, because it will be a protection to it, preventing decay; a roof that will fully meet the requirements of both extremes of climate, a Southern sun or a Canadian frost. To attain these ends, and at the same time meet the variations and exigencies of traffic, the coming roof must be protected on the under side as well as on the top, while such protection should do service as part of the car frame to stiffen and strengthen it.

While confessing their inability to offer anything better than what is at present in use, your Committee have made free to pick holes in the more prominent types of car roofs now in favor, for only in that manner can we discover how to stop them up again. Yet if any one should think this is rather a lame and halting conclusion to arrive at, they would recall to his mind their opening remarks, that the determination of the best car roof must necessarily be a slow process, since in that determining they have to compete with the influences of nature. This fact, taken in connection with the wide divergency of opinion and practice at present observable in the matter, together with the comparatively small amount of experience obtained so far of any other kind of roof than the old "board roof," makes it evident that for your Committee to recommend any one roof to the Association at this present time would be to lay themselves open to the objectionable charge of undue favoritism.

They, therefore, beg to recommend that the subject be carried over another year, and in view of the fact that the Chicago, Burlington & Quincy system are making valuable inquiries and experiments on the car roof question, that they be represented on the new committee.

Through the kindness of parties interested, there will be found for your examination, blue prints and models of quite a number of the roofs referred to in this report.

Attached is a tabulation of the reports received, giving name of road, roof used, and remarks thereon.

J. D. MCILWAIN, Chairman,
L. PACKARD,
S. IRWIN, } *Committee.*

Mr. Joseph Wood then read the following report of the Committee on "The Standard Freight Car Truck and Axle for Cars of 60,000 lbs. capacity."

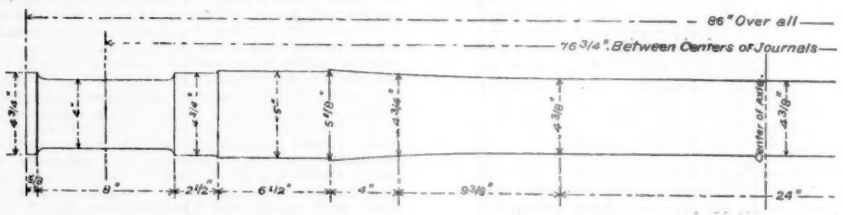
Your Committee, with the limited time at its disposal, has felt that it was impracticable to prepare a general plan and details of a truck, and it has confined its work to submitting plans for such parts of a truck as are frequently renewed, and which, therefore, should be interchangeable and standard. There are accordingly submitted plans of: Axle, Journal Box, Journal bearing, Journal bearing wedge.

In regard to the methods for securing uniformity in size

SYNOPSIS OF REPORTS ON CAR ROOFS.

NAME OF ROAD.	Roofs used.	Remarks.
Missouri Pacific.	Galvanized iron on top of roof boards. During past 5 years "Anchor" iron roof.	Top iron roof gives increased strength to car body. Iron especially good in South and West, where lumber swells and shrinks and turns up at edges and becomes loose, on account of continued rain or sunshine.
	Also ventilated galvanized iron for fruits, etc.	Can be repaired easily. Throws water and cinders off easily; good roof; better than under iron roof.
	Winslow under roof.	Not in favor. Boards twist and get loose very quickly.
Michigan Central, Can. South. Div.	Winslow iron roof.	Good for 15 years. Cost, $38 for 30-ft. car.
Michigan Central.	Hutchins' composition.	Double board, with Hutchins' composition between. Good satisfaction; 2,500 cars have it; 550 more this summer. Cost for 34-ft. car, $35.
Lake Shore.	Winslow roof of galvanized iron, No. 23 wire gauge.	Good for 10 years. Cost, $43.50.
	Winslow asphalt.	Superior to Winslow iron roof, as it adds to stiffness of car, and prevents perforating from inside. Intermediate purlins not necessary. Cost, $40.
Grand Trunk.	Sheet iron; roof ribs and saddles.	Good satisfaction. Cost, $18.45.
Baltimore & Ohio.	I. C. Lorne, charcoal tin.	Cost, $13 per car. Average life, 15 years.
Northern Pacific.	8,000 cars ordinary double board roof.	Objection to iron roof, because so much cold weather, and iron gets coated with frost on inside, but when car gets into warmer country frost melts, and damages freight.
	Winslow asphalt.	Gives satisfaction.
Burlington & Northwestern.	Double board.	All cars.
Chicago, Burlington & Quicy.	"Eaton" roof.	No particulars.
Report of Master Mechanics.	"Empire" roof of Chicago; corrugated galvanized iron.	In use 11 years. One of the cheapest and best; cost, $38 for 34-ft. car; if roofing boards used cost less than $30 per M., roof will be correspondingly cheap.
	Winslow asphalt.	Good and cheap as the rest; in use 6 years; believed to last as long as body of car. Cost, from $32 to $34 for 34-ft. car.
	Hutchins' composition.	Good and cheap as the rest; believed to last as long as body of car. Cost, from $32 to $34 for 34-ft. car.
	Double board roof not favored. Should be superseded,	Winslow asphalt roof has an advantage over all others, in that the under course of boards running lengthwise of the car stiffens the roof. Asphalt roof favored, as against corrugated iron, because cheaper; iron liable to rust and have holes punched through it.
New York, Lake Erie & Western.	Winslow asphalt.	Cost for 34-ft. car, $27. Recently applied; not prepared to give it preference; thinks iron under roof best, similar to Winslow metallic roof.
Atchison, Topeka & Santa Fe.	Winslow roof, galvanized iron.	Box cars.
	Double board.	Stock cars.
St. Joseph & Grand Island.	Winslow roof, galvanized iron.	Box cars.
	Double board.	Stock cars.
Chicago, St. Paul, Minn. & Omaha.	Double board.	Not satisfied with it; in favor of some sort of metallic roof.
Chicago & Alton.	Winslow iron.	Box cars.
	Double board.	Stock cars.
Union Pacific.	Winslow iron.	Last a number of years; never knew one to be worn out; double board not suitable to the climate.
Minneapolis & St. Louis.	Double board roof.	Stock cars.
	Hutchins' composition.	Tried it for 3 years; found perfect on examination.
Central Iowa.	Double board roof.	Stock cars.
	Corrugated galvanized iron.	On 100 cars; think double board roof preferred for all purposes; cheapest in maintenance.
Chicago, Rock Island & Pacific.	Double board.	Standard for all cars.
	Chicago car roof, corrugated iron.	Not sufficient experience of either to speak positively.
	Winslow asphalt.	
Chicago & Illinois.	Double board.	Give satisfaction.
	Winslow asphalt.	
Chicago & Northwestern.	Double board.	All cars. Made no experiments so far with others, as lumber is cheap in this district; think of making experiments.

of axle, which your Committee was also to consider, the following is suggested:



Standard Axle for Cars of 60,000 lbs. capacity, recommended by the M. C. B.'s Committee.

That manufacturers be furnished with drawings, giving forge and finished dimensions, and that when axles vary from these dimensions they be rejected.

June 7, 1887.

M. M. MARTIN,
R. C. BLACKALL,
W. A. SCOTT,
H. ROBERTS,
JOSEPH WOOD,
} *Committee.*

Mr. J. R. WHITNEY, of Philadelphia, was here permitted to address the meeting on behalf of the Chilled Car-wheel Manufacturers' Association. He explained that this body was formed to endeavor to improve the quality of car-wheels, to fix upon a standard size, and if possible to agree upon a uniform system of guarantee and method of testing.

Mr. J. N. Barr (Chicago, Milwaukee & St. Paul), Mr. John Kirby (Michigan Central) and Mr. George F. Wilson (Minneapolis & St. Louis) were appointed a committee to confer with a similar committee appointed by the wheel makers. It is understood that the Master Mechanics' Association will also be asked to nominate one or more members to join this committee of conference.

Mr. WALL moved that a committee be appointed to examine plans and designs for various systems for safely heating cars, and that the Committee be instructed to report fully on the subject at the next convention. (Carried.)

The Committee appointed to select a place for the next meeting recommended Alexandria Bay, in the Thousand Islands. Mr. Southgate, who had entertained them so well at Saratoga, had promised to entertain them still better at the Thousand Islands, and they considered the place presented far greater advantages than any other named.

Mr. John Kirby suggested Chicago. Mr. E. W. Grieves (Baltimore & Ohio) moved that the next place of meeting be Coney Island. It was objected, that though very convenient, it was too near New York, and that members, instead of getting an hotel to themselves, would be swamped by outsiders from the great city.

The committee for nominating officers for the ensuing year then presented their report, and recommended the election of the following gentlemen as officers:

OFFICERS.

President.—W. McWood.
Vice-Presidents.—J. W. Cloud, E. W. Grieve, J. S. Lentz.
Treasurer.—J. Kirby.
Secretary.—M. N. Forney.

Executive Committee.—Jos. Wood, R. D. Wade, T. A. Bissell.

It was moved that the members of the Executive Committee be as follows: Messrs. R. C. Blackall, R. D. Wade and T. A. Bissell. A ballot was then taken, which resulted in the election as members of the executive committee of Messrs. Blackall, Wood and Wade. The other officers were elected unanimously. The other members of the executive committee whose term of office does not expire till June, 1888, are Messrs. F. D. Adams, E. B. Wall and L. Packard. When the election was concluded, Mr. Verbryck stated that as the president-elect was absent in Canada, and the senior vice-president had just left the room, he would introduce the second Vice-President, Mr. E. W. Grieves, to the meeting. Mr. Grieves then took the chair.

Mr. WALL moved that the thanks of the Association be given to the management of the Chicago, Burlington & Quincy Railroad for their public spirit in affording facilities for the Burlington Brake Trials. Carried unanimously.

Mr. RHODES asked if the complete report of the Brake Committee, which was not yet completed, could be published in the annual proceedings. The report, at present before the convention, was only preliminary. If that alone could be published he should be glad to know, so as to avoid the unnecessary labor of finishing the complete report.

Mr. WALL moved that the complete report be published. (Carried.)

It was then resolved that the committee on subjects to be reported on at the next convention, be authorized to report to the Executive Committee.

The convention then adjourned to meet at Alexandria Bay, Thousand Islands, on the second Tuesday in June, 1888.

SUBJECTS OF REPORTS.

The following list gives the names of the gentlemen composing the various committees for experiment and investigation. No report was made to the convention on the subjects marked *. The other reports are published in full in the present issue, except the reports on brakes and couplers, which were published last week.

Standards and Appliances for the Safety of Trainmen.—The committee on this subject is composed of Messrs. H. Hegewisch, U. S. Rolling Stock Co., 35 Wall street, New York; John Kirby, Lake Shore & Michigan Southern, Cleveland, O.; M. N. Forney, 45 Broadway, N. Y.

* *British and Continental Practice in Matters of Interest to the Master Car-Builders' Association.*—Committee: Messrs. R. H. Soule, New York, Lake Erie & Western, Buffalo, N. Y.; Wm. McWood, Grand Trunk, Montreal, Canada; Henry A. Whitney, Intercolonial, Moncton, N. B.

Automatic Freight Car Brakes.—Committee: Messrs. Godfrey W. Rhodes, Chicago, Burlington & Quincy, Aurora, Ill.; Geo. Hackney, Atchison, Topeka & Santa Fe, Topeka, Kan.; B. Welch, Central Pacific, Sacramento, Cal.; John S. Lentz, Pennsylvania & New York Canal & Railroad Company, Packerton, Pa.; W. T. Hildrup, Harrisburg Car Co., Harrisburg, Pa.; D. H. Neale, editor Railroad *Gazette*, New York.

* *The Comparative Advantages of the Two Methods of Constructing Freight Cars, with and without Platform Timbers or End Sills projecting from the End of the Car.*—Committee: Messrs. E. B. Wall, Pittsburgh, Cincinnati & St. Louis, Columbus, Ohio; B. K. Verbryck, Chicago, Rock Island & Pacific, Chicago, Ill.; George W. Cushing, Philadelphia & Reading; W. H. Harrison, Baltimore & Ohio Railroad, Baltimore, Md.; W. F. Turreff, Cleveland, Col., Cinn. & Ind., Cleveland, Ohio.

* *Maximum Outside Dimensions of Freight Cars.*—Committee: Messrs. John P. Levan, Pennsylvania Railroad, Altoona, Pa.; C. A. Smith, Union Trunk Line, 267 Fourth street, Jersey City, N. J.; George C. Watrous, Detroit, Lansing & Northern Railroad, Ionia, Mich.

Standard Draw-Gear for Non-Automatic Couplers.—Committee: Messrs. T. Sutherland, Chicago & Grand Trunk, Detroit, Michigan; Allen Cooke, Chicago & Eastern Illinois, Danville, Ill.

* *Appliances to Prevent the Slipping of Wheels, both Passenger and Freight.*—Committee: Messrs. J. W. Marden, Fitchburg Railroad, Boston, Mass.; E. W. Grieves, Baltimore & Ohio Railroad, Baltimore, Md.; W. H. Day, Wilmington, Columbus & Augusta Railroad, Florence, S. C.

11. *Standard Freight Car Truck and Axle for Cars of 60,000 lbs. Capacity.*—Committee: Messrs. Joseph Wood, Pennsylvania Company, Fort Wayne, Ind.; H. Roberts, Grand Trunk & Detroit, Grand Haven & Milwaukee Railways, Detroit, Mich.; M. M. Martin, Wabash, St. Louis & Pacific, Decatur, Ill.; R. C. Blackall, Delaware & Hudson Canal Co., Albany, N. Y.; W. A. Scott, Chicago & Northwestern Railroad, Chicago, Ill.

Standard Sizes of Lumber for Freight Cars.—Committee: Messrs. William Forsyth, Chicago, Burlington & Quincy Railroad, Aurora, Ill.; Frank J. Hecker, Peninsular Car Works, Detroit, Mich.; W. R. Davenport, Erie Car Works, Erie, Pa.

The Best Form and Construction of Car Roofs.—Committee: Messrs. J. D. McIlwain, Grand Trunk Railway (Great Western Division), London, Ont.; Samuel Irwin, Missouri Pacific Railroad, Sedalia, Mo.; L. Packard, New York Central & Hudson River Railroad, West Albany, N. Y.

* *Subjects to be Reported for Investigation and Discussion at the Next Annual Convention.*—Committee: Messrs. J. W. Marden, Fitchburg Railroad, Boston, Mass.; John W. Cloud, Pennsylvania Railroad, Altoona, Pa.; Thomas A. Bissell, New York Central Sleeping Car Company, Buffalo, N. Y.

The Adoption of a Standard Automatic Freight Car Coupler.—Final report by the Executive Committee.

EXHIBITS.

Among the exhibits shown in the hall of the West Hotel, Minneapolis, during the recent convention of the Master Car-Builders' Association, and not enumerated in our previous issue, were four different patterns of the Scarritt chair. Three of these chairs are adapted for parlor cars and one for chair-cars. All have an adjustable foot-rest, which slides out of the way and underneath the seat of the chair when no longer needed. In three of the chairs the angle of the back is also adjustable; the adjustment is easily worked and is simple in construction and does not appear likely to get out of order. These chairs, however, are principally distinguished by the larger amount of horse-hair used in stuffing the backs, seats and arm-rests. The three larger chairs have no sharp corners, an excellent point and calculated to save ladies' dresses and men's elbows. The frame-work of the chairs is very strong and well secured by double bevel tenons. In some of the chairs, including that used by the Pullman Palace Car Company, no gimp is used, which is considered objectionable on account of its liability to fray. The backs and arm rests as well as the seats are framed and can be easily removed from the main body of the chair.

A model is shown of the Rigby car wheel. The body of the wheel is made of cast steel, alloyed with aluminium. The body while still hot is compressed by hydraulic pressure and is locked into the tire so that the tire cannot, when broken, leave the wheel.

The Van Beek car chair is shown by the Streator Reclining Car Co. The back can be reversed and placed in several different positions and a movable and adjustable foot-rest is also provided.

The Detroit Car Truck Co. show a box-car almost entirely constructed of steel, and mounted on trucks fitted with a long equalizing beam.

The Blaine Car Manufacturing Co., of Dayton, O., exhibited an automatic dump car of very ingenious construction. The doors are self latching and open automatically when the body of the car is inclined to a certain angle.

The Van Dorsten car coupler has an elastic cushion, consisting of a piece of rubber confined so that it cannot be injured by blows in coupling.

The Ross brake shoe with Meehan steel pieces was shown on a Mann Boudoir car, which runs regularly on the Cincinnati, New Orleans & Texas Pacific.

This car is equipped with a pair each of Allen, Ramapo, Washburn and Wednesbury steel-tired wheels. Last September the car was taken to the company's shops, after having run 22,040 miles. The wheels were all returned on account of sharp flanges, common cast iron brake shoes having been used. On Oct. 7, 1886, the car was again placed in service with the same wheels, but, instead of old old style cast shoes, the Meehan flange and outside-of-tread bearing brake shoes were substituted.

It is stated that this car, since last October, has been in continual service, having up to date ran more than 100,000 miles. All the wheel tires are in good condition, and there has been but one renewal of shoes during all this period.

This shoe has pieces of hard crucible steel imbedded in the parts of a Ross shoe bearing on the top of the flange and on the outer part of the tread. It is claimed that these hard pieces act as turning tools and trim the wheel true.

The Fox Machine Co. exhibited a patent universal trimmer mitering machine for cutting moldings at any angle.

The following car couplers, in addition to those already mentioned, were exhibited either by actual full-sized drawheads or by wooden or brass models: Rivers, Robinson, McGrath, Howard, Edwards, Sherman, Campbell, Fish and Raddin.

Mr. John M. Finnerty exhibited a rail joint and Mr. S. R. Stennard exhibited a car journal box.

NOTES.

On Thursday afternoon a majority of the visitors to the convention were taken out to Lake Minnetonka over the Minneapolis & St. Louis road and were entertained at the Lake Park Hotel. The whole affair was a great success. Covers were laid at the hotel for 284 people, and a cold collation was served in a very satisfactory manner. Speeches were made by Mr. E. H. Andress, M. J. Weimer, Mr. Geo. W. Morris, Commissioner L. S. Coffin, of Iowa; Col. Herrick, of Cleveland, Ohio; Mr. H. A. Towne, of Minneapolis; Mr. F. D. Adams, Mr. Tooth and others.

Mr. Coffin referred especially to the fact that during the debate in Congress on the Inter-state Commerce bill, no reference was made and no amendment proposed in the interests of the safety of trainmen. He thought this omission a very serious one, but trusted that the members of this convention would be more mindful of the lives of men than Congress. A vote of thanks was passed to the M. & St. Louis Railway Company, with special mention of the names of Mr. W. H. Truesdale and Mr. G. F. Wilson, the Superintendent and Master Mechanic of the line.

On arriving at the lake the party went for a trip on the steamer "City of St. Louis," which two days afterwards was wrecked in a squall. An excellent band accompanied the party, but the great heat effectually prevented all but a few enthusiasts from dancing. Indeed the unusual heat has formed the only drawback to an otherwise very pleasant convention at which much serious work was done.

The West Hotel is an exceedingly handsome and commodious structure, and the visitors were very comfortably entertained, though the slowness of the service at meals and one or two other points left something to be desired.

The city of Minneapolis excited the warm admiration of all the members and their friends, though few of the latter had much time to devote to sightseeing, amid the bustle of an unusually animated and busy convention distinguished by many interesting and even exciting reports and debates upon questions of vital interest.

The following is an approximate list of the representative members present:

F. D. Adams, La Mott Ames, R. C. Blackall, L. Packard, R. W. Bushnell, J. W. Cloud, W. Forsyth, Clem. Hackney, Geo. Hackney, E. W. Grieves, A. F. Jackson, J. Kirby, J. N. Lauder, J. S. Lentz, J. Mackenzie, J. W. Marden, J. D. McIlwain, Robt. Miller, C. W. Mills, T. Sutherland, H. L. Preston, G. W. Rhodes, D. C. Richardson, W. J. Robertson, F. L. Sheppard, W. B. Snow, J. Townsend, W. F. Turreff, B. K. Verbryck, R. D. Wade, E. B. Wall, R. H. Wilbur, Joseph Wood, Henry A. Whitney, George F. Wilson and C. J. Butler.

Among the active members present were the following: Thos. A. Bissell, John Cowan, G. W. Demarest, John F. Devine, G. W. Ettenger, J. B. Fletcher, W. A. Foster, G. H. Gramling, L. Finlay, F. J. Hecker, J. Hodge, D. B. Hunter, S. Irvin, A. M. Kitteridge, L. J. Cox, H. C. McCarty, F. M. Wilder, H. M. Perry, J. Richardson, W. A. Stone, B. Welsh, C. A. Smith, T. B. Voglen, Ross Kells, C. M. Leonard, J. H. Davis, W. T. Small, J. Meehan, J. S. Patterson and J. T. Casey.

There were in all fully 70 members present, and nearly all the most important lines in the country were represented. Several railroad officers not members of the M. C. B. were present, including several members of the Master Mechanics' Association, the President, Mr. Jacob Johann, taking an active part in the debates. Mr. Geo. Gibbs (Chicago, Milwaukee & St. Paul), Mr. Joseph Porter (Indiana, Bloomington & Western) and Mr. N. W. Howson (late Cumberland & Pennsylvania) were also among those present.

The St. Paul Meeting of the Master Mechanics' Association.

TUESDAY.

The convention met at Chamber of Commerce at St. Paul at 10 a. m. and was opened by prayer. The Association were welcomed to the city by the Hon. Charles D. Kerr, President of the Common Council. He referred to the great importance of railroads in opening up the state of Minnesota, which, young as it is, has over 4,000 miles of railroad in operation. He stated that though not an old settler, there were but 39 miles of railroad in the state when he first arrived 22 years ago.

The Association was also addressed by Mr. Thos. Cochran, Jr., Vice-President of the Chamber of Commerce. He claimed that St. Paul was virtually the capital of a territory of 400,000 square miles, as much as all New England, Pennsylvania, New York, Ohio, Illinois, the two Virginias Mississippi and Louisiana. We have ten systems of railroads centering in St. Paul, and a single road, the Manitoba, has within a year built nearly 800 miles of railroad.

The secretary then called the roll and 86 full members, 3 associate members and one honorary member responded. This was stated to be the best roll in the annals of the association.

The Vice-President, Mr. Jacob Johann, then delivered his address and referred in feeling terms to the death of the President, Mr. Wm. Woodcock. He also referred to the death of four other members, Mr. Geo. Colby, Mr. W. W. Evans, Mr. H. G. Brooks and Mr. Geo. E. Howe.

Mr. J. Davis Barnett proposed a note of condolence to Mr. Woodcock's widow, which was accepted and entered in the minutes; the vote was supported by Mr. Lauder, Mr. Sprague, Mr. Sinclair and Mr. Briggs.

A discussion then took place on the use of lump coal and run of mine coal. Mr. N. A. Whitney (Inter-Colonial) found that run of mine coal could be used when it came from hard bituminous coal, but would not answer where the coal was very soft or full of slate. Mr. Sprague (H. K. Porter & Co.) thought that it depended largely on the kind of grate bar used. Mr. Foster (Fitchburg) stated that they used slack coal with good results.

The secretary asked for an expression of opinion on the merits of the extended front end. He considers that it did not give a saving of fuel, but when rightly applied would prevent sparks. Mr. Lauder used the extension front on nearly all his engines in combination with a single high exhaust nozzle, and found nearly all the sparks were deposited in the front end and were not thrown out of the stack. With a large boiler and careful firing with these appliances and a brick arch, there was little smoke. As generally used there was a difficulty in getting a proper draught, the smokebox being filled up by the baffle plate; he had adopted a style of blast pipe which had been illustrated in the *Railroad Gazette*, which got rid of these difficulties and prevented the flues at the back of the boiler filling up. While it improved the steaming of the engine and lessened sparks, there was no saving of fuel. Mr. Hickey (Milwaukee, Lake Shore & Western) believed the extended front was a success if properly fitted up; it saved fuel and prevented sparks, and saved the material in cone and netting. Mr. Swanston (Jefferson Madison & Indianapolis) claimed no economy for the extension front, but found increased cleanliness and freedom from sparks. Mr. John McKenzie (New York, Chicago & St. Louis) did not believe in the extension front end. It weighs 5,000 lbs., which is prejudicial to the trucks. With a properly constructed ordinary front end, diamond stack and a brick arch, we get less smoke and a better result, and do not make any fires on the side of the track. An engine will fill the front end twice in 140 miles, and when once full it is far more liable to throw sparks than an ordinary stack. Mr. Buffet was in favor of the extension front. Mr. Cooper (Lake Shore & Western) did not believe in the extension front and was using a straight stack with a long nozzle and No. 11 wire netting. Mr. Lowe said that extension fronts were 20 years old and had been used and abandoned several times. He asked why the Association did not settle the question. All the fires did not come from sparks thrown from the chimney, but many came from the ash pan, especially on windy days. Mr. Sinclair defended the Association from the charge of being non-progressive and thought that the extension front was used because it appeared to be the only practicable device for preventing sparks. Mr. E. M. Roberts was much in favor of the extension front, he used netting with 3½ mesh to the inch, of No. 13 wire, which prevented large sparks passing through. It would not stop the fine dust. The weight of the extension did not exceed 1,000 to 1,500 pounds. Many extension fronts had not given satisfaction solely through faulty workmanship. Mr. Cooper had noticed the results given by extension fronts and thought they were not as good as those he obtained in his own line without them. Mr. Jas. Meehan (Cincinnati, New Orleans and Texas Pacific), stated that the Cincinnati Southern in 1881 paid $33,000 for damages from fires. He introduced the extension stack in combination with brick arches and had not paid a dollar for fire since. The cost of the extension is nominal. The fire-brick arch consists of five bricks, costing 60 cents each, and we use two arches a year. If the extension is put on properly, air-tight, you will have no trouble, and the brick arches will prevent sparks being carried into the extension front.

WEDNESDAY.

The Secretary's report was read. It stated that since the last report, 28 full members and one associate member have been admitted to membership, 5 members have resigned, and 12 have been dropped from the rolls for non-payment of dues, 1 as per resolution passed at Boston, and 5 members have died, while 4 full members have been made honorary members, and the Association now numbers 251 full members, 14 associate and 14 honorary, making a total membership of 279.

The funds were in flourishing condition, and he suggested that the secretary's salary be increased. Various railroads and manufacturing firms had contributed $722 towards the printing fund. The receipts from members' dues had been $1,198. The Boston fund now amounts to $5,200, invested in government 4 per cent. bonds, and $676 not yet invested. The report was accepted.

The Treasurer, Mr. Geo. Richards (Providence & Boston), reported that the receipts for the year had been $1,978, and the expenses $1,934, leaving a balance in the hands of the Treasurer of $4.97. The expenses had been really wholly incurred in printing and engraving and the Secretary's salary, the latter being $800. An auditing committee was appointed to examine the Treasurer's report.

The report of a committee on the best proportion of locomotive cylinders was then read. They stated that though they had sent out a large number of circulars, they had only received replies from Messrs. Barnett, Meehan, Sinclair and Mr. J. McGrayel, of the Des Moines and Ft. Dodge; Thos. Twombley, of the Chicago, Rock Island & Pacific; Mr. S. G. Copestake, of the Glasgow Locomotive Works, Scotland, and from Mr. F. W. Webb, of the London & Northwestern. Most of the gentlemen gave rules which they used for proportioning the diameter of cylinders and stroke to the diameter of the driving wheel, the boiler pressure and the weight on the drivers. These rules gave very varying results, as shown below.

For a passenger engine with 26-in. stroke of piston, 61 in. mean diameter of driving wheels, 160 lbs. boiler pressure and 60,000 lbs. weight on drivers, the rules given by the following gentlemen gave the folowing results:

	Inches.		Inches.
Barnett	14.5	Copestake	16.9
McGrayel	16.6	Webb	15.7
Meehan	16.2	Rule proposed by the Committee.	16.1
Twombley	16.9		

The Committee proposed a rule in which the mean effective cylinder pressure was taken at 85 per cent. of the boiler pressure, and that the tractive force thus given should be one-fourth of the adhesive weight for passenger engines, 1 divided by 4¼ for freight engines and 1 divided by 4½ for switching engines.* The report was accompanied by an interesting table, showing the variation from the Committee's rule found in a large number of engines actually running and designed by both American, British and Continental engineers. Many of the passenger engines appeared to possess considerable excess of weight, while many of the freight engines and all the switching engines were deficient in adhesive weight.

The discussion on the paper being opened, the President called on Mr. Charles Blackwell (Union Pacific), the chairman of the Committee for any remarks. Mr. Blackwell having briefly explained one or two points, Mr. John Hickey stated that on his road they used two classes of American type engines; both had 17×24 in. cylinders, 62 in. drivers and 140 lbs. pressure; one class of engines, however, had 51,000 lbs. on the drivers, while the other had 59,000. He found that this difference in weight made a considerable difference in their hauling power and in the wear of tires and machinery. The heavier engines would haul 30 tons, or 1½ cars, more than the lighter ones; and while they wore the tires more there was less wear on the machinery. He considered that 15,000 lbs. per wheel was a proper load and that 16,000 lbs. was a maximum, as anything above this increased the wear of tires very rapidly. The Secretary, Mr. Setchel (Brooks Locomotive Works), did not believe in having cylinders too large for the engines. Mr. Barnett (Midland Division, Grand Trunk) believed that a large cylinder gave opportunity for greater expansion. The formula quoted by the Committee gave varied results because founded on various assumptions. In good modern engines the fall from initial pressure was not more than 7 per cent. He assumed one-fifth as the co-efficient of adhesion, because his line went through a woody country, and he was much troubled with snow, and ample adhesion was very necessary for any engine working in snow. Mr. Angus Sinclair considered that the report would prevent engines being over-cylindered, which had been too prevalent a practice. A small boiler and large cylinder meant an extravagant use of fuel, as the engines were loaded in proportion to the cylinder and not in proportion to the boiler; it was better to increase the pressure than the diameter of the cylinder. Practically they never obtained more than four-fold expansion in locomotives; more expansion, if possible, would be advisable. Mr. Lauder believed that higher pressures would be adopted; Mr. Underhill, on the Boston & Albany, has used 160 lbs. to the square inch for many years with excellent results; Mr. Stevenson, of the Lake Shore, had used 180 lbs., and on the old Colony the speaker had used 170 lbs. He thought a higher pressure was preferable to a larger cylinder; the use of better and larger boilers was now possible, and rendered the use of higher pressures practicable.

The report of the Committee on Traction Increasers was then read.† They stated that they had just sent out a circular asking questions, and had received 15 answers, which may be summarized as follows: Mr. Meehan considered that it was better to make heavier boiler, frame and springs than to use traction increasers. Mr. Lauder had abandoned their use. Mr. McGrayel did not believe in them. Mr. G. W. Ettenger (Chesapeake & Ohio), would only advise such a device where the boiler capacity was excessive, and would prefer that the engine frame should be extended to take the tank. Mr. Jno. McKenzie's experiments with traction increasers had been satisfactory. Mr. Barnett had added a tank to light engines for local traffic, and considered that in new engines the tank should be permanent. The Committee recommended that the subject be continued.

In the discussion which followed Mr. R. H. Briggs, the chairman of the Committee stated that traction increasers were beneficial to engines which were too light for their cylinder power. Mr. Lauder hoped that the subject would not be continued; though a device of this kind had been before the public 20 years none were now in use, and he believed consequently that they were utterly useless. The extra weight was trying to the springs and was injurious to the engine and roadbed. Mr. McKenzie believed that for over-cylindered engines a traction increaser saved the wear of the tires; the device was only intended to be used when the engine was running slowly, as in shifting or getting over a hill, and therefore would not be prejudicial to the springs or tires; he had only one engine fitted with a traction increaser, but he found that one needed only one box of sand per week, while the ordinary engines required two or three per day. Mr. N. W. Howson (Eames Vacuum Brake Co.) moved that traction increasers with present style of engine are unnecessary. The President asked if it was neces-

* This paper will be printed in full in the next issue of the *Railroad Gazette*.

† Both of these engines have been recently illustrated in the *Railroad Gazette*.

sary to dignify traction increasers by a resolution. Mr. John Hickey believed in traction increasers if automatic. Mr. Howson advised placing iron on the top of the boiler if adhesion was deficient. Mr. Setchel pointed out that all engines had a traction increaser in the shape of a sand-box, and that a sand-box was more injury to an engine than additional weight on the wheels, which would often be useful in a pinch and take the place of sand. Mr. Henry proposed that two additional members be placed on the Committee. The resolution was lost, and the report of the Committee accepted and the Committee continued.

The report of the Committee on Cross-heads and Guide bars was then called for, but the chairman, Mr. Howson, merely reported progress and asked that the Committee be continued. Carried.

The report of Committee on Cylinder Packing was then read. They reported a large number of replies giving particulars as to the size and kind of piston rings in use. The majority of those answering used two cast-iron rings cut in one place, with a piston head composed of a spider follower plate and tee rings; the rings having no springs to set them out, conforming to the shape of the cylinder by their own elasticity only. Five roads preferred to use the solid head on the ground that it is cheaper and has no loose parts liable to get adrift and cause accident. Mr. Bennett found that cylinders would run 150,000 to 200,000 miles without re-boring, but considered it was better to take a light cut every hundred thousand miles. It seemed to be generally conceded that with steam packing the cylinders wore more at the ends, and that the wear is less with cast-iron rings than with brass rings.

The discussion being opened, Mr. W. Sprague (H. K. Porter & Co.) asked why the Committee recommended that the rings should be turned larger than the cylinder; that was an unmechanical method and the ring consequently would not fit the cylinder exactly. He had compressed the rings with lap joints and turned them true to the diameter of the cylinder for the last fifteen years and had found no difficulty in doing so. Mr. Albert Griggs (Providence & Worcester) turned the rings larger than the cylinder, then cut out a piece and re-turned the ring to the true size. Mr. Lauder said the discussion seemed to hinge on questions of detail. The rings as commonly turned (larger than the cylinder) would be so slightly out of true that it was immaterial. The principle of the packing now generally used was that the elasticity of the ring itself would keep it tight. He cut the rings diagonally, so as to be $\frac{3}{32}$ in. apart, and thought the circle was near enough without a break joint. He allowed the rings to revolve. Practically every one is now using cast-iron solid rings.

After a short adjournment the President announced that they were now open to discuss any question brought before them, as was the practice during the noon hour of the second day of the Convention.

Mr. Burford asked what was the proper mileage to run to a pint of oil. He considered 75 miles a fair average. Mr. Setchel thought it depended largely upon circumstances. Mr. John McKenzie had found that passenger engines running 116 miles per pint of cylinder oil gave excellent results, and that on his line engines had run double that distance with everything in good condition. He allowed 80 miles for freight and 116 miles for passenger. The men were not given any money premium, butwere thought more of when they did well. As regards consumption of coal and oil, he used the Detroit, and Nathan & Dreyfus sight-feed lubricators. Mr. Hatswell (Flint & Pere Marquette) also used sight-feed lubricators, but found only 15 miles as an average. Mr. R. H. Briggs considered automatic lubricators superior to the old-fashioned method. Some years ago, on a line with which he was connected, the cost of valve oil was 34 cents per hundred miles run using Galena oil. When the automatic lubricators were introduced, this was reduced 18 cents, using valvoline, and during 1884 and 1885 this figure has been further reduced to less than 3 cents, although the oil costs a dollar a gallon. The cost per hundred miles run was a better criterion than the amount consumed. Mr. Briggs' figures were received with considerable incredulity; but he maintained their correctness. The President called attention to the fact that the smallest consumption per mile of both oil and coal did not always give the best results; that it was often well to consume a little more in order to haul a heavier train.

Mr. Lauder then introduced the subject of high pressure steam. He thought the present pressure might be increased, and in many instances higher pressures were being carried in this country with good results, especially for passenger engines. The increased loads which we were now obliged to haul necessitated more power, which is easily obtained by the use of higher pressure. There was little difficulty with modern passenger engines slipping, but there was a difficulty in getting sufficient power at high speed, and the problem was to increase that power without increasing the weight. An engine would not stand being worked at a 10-in. cut-off for any great distance, but with a higher pressure the same power could be obtained with an earlier cut-off, which would enable the engine to steam freely. He had found no difficulty on the score of lubrication. One of his engines with 175 lbs. pressure was driving the well-known Fall River boat train on the Old Colony. He used balance valves and a large boiler with nearly 1,500 feet of heating surface. They had never before been able to get an engine that would steam satisfactorily in doing this work, but with this engine the large amount of heating surface gave plenty of steam, and the high pressure with a 10 in. cut off gave all the power they needed in working up the Stoughton grade. They hauled 13 cars, eleven of which were 60 feet long and held 76 passengers each. The train was often composed of 15 cars. He believed that boilers could now be made to safely carry 200 lbs. to the square inch. Mr. Howson said that boilers doubtless could be built that would, carry any pressure, but the difficulty was to use steam economically in the cylinder without condensation. To obviate this it was necessary that the steam should be superheated. Mr. Lauder did not anticipate that superheated steam would be used in locomotives and it introduced some complications. Mr. Hickey said that the pressure depended on the strength of the boiler and agreed with Mr. Lauder that increased boiler would promote economy. The experiments on the C., B. & Q. made some years ago with superheated steam were unfavorable.* The lubrication was difficult and the additional expense of superheaters was considerable. Higher pressures were better than larger cylinders, and boilers should be made to carry 180 to 200 lbs.

Mr. L. M. Ames (Beech Creek) wished to ascertain the opinion of the silent members, and therefore moved a resolution that it is not advisable to increase the boiler pressure of freight engines above 135 lbs. Mr. Lauder opposed the motion and Mr. Burford also opposed it, as he had screwed valves down when he was an engineer and had found it a decided benefit. Mr. Sinclair considered that high pressures were more useful for freight than for passenger engines as the former were worked generally with less expansion. He objected to the resolution as fixing a limit to progress. Mr. H. Cooper (Lake Erie & Western) considered that all boilers should be strong enough to carry 140 lbs. The discussion was then adjourned.

Mr. Ames' resolution having been withdrawn, the President announced that the Strong locomotive had arrived, and that that Mr. Strong wished to take the members for an excursion on the Chicago, Milwaukee & St. Paul in order to show the capability of the engine. Mr. Barnet moved that the Association examine the Strong engine, but decline the excursion. Mr. Riggs urged that Mr. Strong be encouraged as an inventor. The President then suggested that Mr. Strong be allowed to address them for five minutes. This was agreed to, and Mr. Geo. S. Strong came forward and stated that he had been at work on the engine for seven years and had not hitherto brought it before the public. The considerable difference between his engine and an ordinary locomotive could only be appreciated by riding on it. He believed that he could run twelve coaches full of passengers at 60 miles per hour. It was then agreed that Mr. Strong's invitation be accepted. The excursion will probably take place on Thursday. The Association then adjourned to meet on Thursday morning.

SUBJECTS ON WHICH REPORTS ARE TO BE MADE.

The following is a list of the subjects upon which reports are to be made:

1. Proportions of Locomotive Cylinders: To give the best results what rule should be followed for proportioning the cylinders of an engine when the size of driving wheels, weight available for adhesion and boiler steam pressure are given quantities?

2. Traction Increasers: Their various types and relative merits; also cases in which their use can be recommended.

3. Cross Heads and Guide Bars: The various types in use, the materials and their construction and results obtained.

4. Packing: The various forms of piston packing in use, and obtained results. Also the most economical and satisfactory packing for piston rods, valve stems, regulator and air pump stuffing boxes, with results obtained.

5. Locomotive Preparation: Washing and lighting up locomotives, showing the best system in use for washing out, and most economical and expeditious mode of raising steam in firing up, and the necessary plant for same.

6. Coaling Up Locomotives: The various plans in use, and their relative cost and efficiency.

7. Standard Form of Tire Section.

8. What Control Has the Engineer Over the Wear of Driving Wheel Tires?

NOTES AND EXHIBITS.

A party of about 150 master mechanics and their friends on Wednesday afternoon visited the Northern Pacific cars already described in these columns. The train was hauled by the Strong engine, "Duplex" number 444. The party were shown round by Mr. J. C. Barber, master car-builder.

The Brooks patent car and locomotive truck was shown on a flat car which was derailed by running off an open switch. The experiment was pronounced a success, but the nature of the device is not such as to render it of much use in actual service.

On the return trip the Safety Car Heating and Lighting Co. exhibited their system of steam heating, which has been already fully described and illustrated in the *Railroad Gazette*. Mr. F. M. Wilder and Mr. H. A. Little on behalf of the company explained the device to the visitors. Among the exhibits shown at the Convention were the following: The Big Sandy Sand Dryer, exhibited by E. M. Roberts, of Ashland, Ky. This dryer is of very simple construction, is entirely self-contained, the parts exposed to the fire are easily renewed and do not come in contact with the sand. It has been in use on the Chesapeake & Ohio for three years. The Boies steel wheel is shown by the Dickson Manufacturing Co., of Scranton; the Kalamazoo Velocipede and hand car are also shown. M. M. Buck, of St. Louis, exhibits a head-light with illuminated figures on the sides and front. The Stark Car Brake Co., of Toledo, Ohio, show a model of a method for working a car brake by levers from either the ground or roof. The specialty of this device is that when locked by a man applying it from the roof it can be unlocked and taken off by a man on the ground and vice versa. Geo. W. Marble shows some Acme wrenches of ingenious construction. The Colby patent coupling is shown by a medel. This coupling is intended to be attached to the rear end of tenders and can easily be uncoupled from the Miller hook on a curve, the hook being movable. Phillips, Nimick & Co., of Pittsburgh, show specimens of flanged iron from their Sligo rolling mills. A model is shown of the Blaine side dump car. Two hundred of these cars are now building for the Union Pacific. Farrell's bandless locomotive spring is shown by the Detroit Spring Works. The Detroit Lubricator Co. show double sight-feed lubricators. May's double latch reversing lever is shown. The Burton Lumber Co., of Baton Rouge, La., exhibit specimens of their cypress weather boards. It is stated that this lumber, when exposed to the weather, will last for fifty years. Some ingenious rerailing frogs were shown, adapted for use either on the right hand or left hand of a curve, but no name of exhibitor was visible. The same may be said of a model coal pocket. Drawings were shown of the Booth balanced valve for locomotives. A model was shown of the Brooks safety car and locomotive truck. This device involves the use of an extra pair of wheels on each axle, and therefore hardly commends itself to the attention of practical men. An excellent model was shown of the pattern of locomotive built at the Portland Locomotive Works in 1862. The model was unusually correct to the smallest details, and excited considerable interest. Among the visitors were three gentlemen who served their apprenticeships at these works about that time. The model was made by a ship carpenter named J. D. Ellis. Several forms of the Hancock inspirator cut open to show the interior were exhibited. The McIntosh cross-head pusher was shown. The Consolidated Brake Shoe Co. exhibited the Meehan shoe, in which pieces of hard steel cast in the shoe served to turn down the part of the tire not usually in contact with the rail. In addition to these exhibits, several that were shown at the Master Car-Builders' Convention were also exhibited.

Rail Sections.

A paper on Rail Sections, by Mr. W. F. Mattes, which was read at the Scranton meeting of the American Institute of Mining Engineers, was published in the *Railroad Gazette*, April 8, 1887. The following discussion has since been printed, and is here given in abstract. Such matter is omitted as has recently appeared in the *Railroad Gazette* in Mr. Sandberg's letters and otherwise.

C. P. SANDBERG: With regard to Mr. Mattes' citation of my own testimony, and his inference as to my reason for increasing the thickness of the web * * * my reason was simply based on the experience of many years as to the behavior *in the track* of rails with relatively thin and thick webs. The latter keep up to the level; the former bend down at the ends or joints, after millions of tons have passed over them. I think this prolonged test in the track is more reliable than single tests or calculations; in fact, it is the only reliable one. The thickening of the web downwards, as proposed by Mr. Mattes, has been in use for twenty years on one of the Irish railways, but has not been adopted elsewhere to my knowledge. The mitred cutting of rail-ends, which he mentions and justly condemns as useless, was tried in Wales some twenty years ago and abandoned. After all, I have little to say concerning the minute details of rail-sections, in view of the much greater importance, in my view, of insisting upon increased weight (permitting increased hardness) of rails, to suit them to the severe requirements of modern traffic. I fear it is no longer possible, if it ever was, to bring manufacturers and engineers to unite upon standard sections. Meanwhile, the crying need of the hour is *more metal in the rail*. Last year I ventured to prophesy accidents on American roads from too great economy of material; and I am sorry to see that the winter proved my prophesy true. We have had our warnings in Europe also; and with us the change which they indicated is rapidly coming to pass. I trust the same will be the case in the United States. Mathematical formulas are very well; but let them not be used to justify light weight! My views have been so often stated that I need not repeat them here. They may be summed up in a single sentence. We can get increase, both of safety, comfort and durability, by using heavier and harder rails.

Mr. MATTES: It is very satisfactory to have Mr. Sandberg's assent to a longer radius for top-bearing surface. * * After all that has been said and done and suffered, in the evolution of the old pear-head into its present form, Mr. Forney, in the *Railroad and Engineering Journal* for May, calmly raises the question, "whether a fishing angle of 30 degrees can be used without unduly straining the fish bolts," and then proceeds to offer evidence to show that the bolts will not break. A sufficient answer might be given by reference to page 19 of this paper, and to pages 194, 369, 532 and 533, vol. ix. of *Transactions;* the fact being that this criticism, like the comments of the *Gazette* upon bearing-surface, misses the mark. With sections of the proposed weight we fear abrasion, not breakage; and we are designing for future years, with the increased severity of conditions which traffic requirements will demand, and heavy sections invite. We require, under years of service, a degree of rigidity at the joints which can never be obtained with a 30 degree angle, or anything like it. A perusal of the above references will also acquit me of the charge, which Mr. Forney makes, of adopting equal angles at top and bottom from mere force of habit.

The sloping sides of the Welch-Sayre-Chanute head have been so almost universally adopted by American engineers, that I did not anticipate any serious opposition to 6 degree angles. But as the periodical re-examination, which all things in this age have to undergo, appears to be questioning our practice in this respect, it may be well to have the principal arguments therefor spread upon the record.

Mr. Chanute was led to the adoption of this feature by a systematic observance of actual forms of wear. But, while his method and conclusion have been approved by our highest authorities, it is very probable that the beveled side owes much of its popularity to the facility with which it furnishes the bearing-surface necessary to the repose of the fish-bar in old age. It also serves a useful purpose in maintaining the gauge and the width of head against lateral wear; more or less of which is inevitable with any form of head.

It is undeniable that excessive side-slope leads to excessive wear, and the question thus becomes closely related to that of corner-radius. In the determination of these proportions we must have reference to the wheel-profile, and here comes in the great law of averages. It is the *average*, not the new

wheel that we have to deal with, and its form will be determined in part by the car-builders and in part by the rail-pattern. With a sharp-cornered rail, the flange of a new wheel is held away from the rail, but the concentrated pressure soon eats away the throat-fillet, and the average profile will show a tendency towards figs. 15 and 26 [*Railroad Gazette*, April 8, pp. 230–231], resulting in a constant chamfering of the sides. On the other hand, an excessive corner-radius establishes at once an unprofitable grinding contact. An excessive slope carries down the contact at an early stage, and the lateral pressure is supplemented by a component of the vertical.

Observations of wear upon the later Pennsylvania patterns showed a slight excess of lateral contact, and the question was how to reduce it. Comparison with other rails, and consideration of the probable throat-radius of the average wheel, pointed to a reduction of the corner-radius. Possibly this should have been reduced to 1/4 in. It was fixed at nine-sixteenths because it was evident that only a slight reduction was needed, because the larger radius is better for the wheels, and because the universal adoption of a large radius by the railroads will so improve the average wheel, as to partly correct the trouble. * * * As the Von Weber experiments [on web thickness] have really no practical value, it would not be worth while to pay them much attention, were they not so continually quoted. For this reason I propose an examination, and reproduce the *Gazette's* description in full. [See *Railroad Gazette*, April 18, 1887.]

* * * A piece of Delaware, Lackawanna & Western 67-pound rail, 24 1/8 in. long, was planed down in the web, by a round-nosed tool, to a thickness of 1/8 in. It was then spiked at the middle to a hemlock tie, two spikes being placed on the outside to hold the rail in place, and one on the inside, to be drawn. Pressure was applied to the head, directly over the inside spike by a hydraulic ram, the spike started, and the rail was found to have received a set of five sixty-fourths inch, measured at the point of application of the ram. Taking the spike-resistance in this case also at 3,000 pounds, calculation gives $S = 150{,}000$. The position of the rail toward the ram being then reversed, it was spiked to an oak tie, and an application of pressure doubled it over without disturbing the spikes. Of course a single experiment is not conclusive; but the high values of S obtained in both cases with comparatively soft ties, the undue favorable assumptions in the calculation of the von Weber rail, and the fact that his was iron and mine excellent steel, make it reasonably certain that his spikes drew too easily for comparison with American roads. To fully bring out the worthlessness of such experimental data, we have only to remember that a hollow wheel-tread or a worn rail-top is liable to cause the thrust of a flange to be accompanied by an application of the entire vertical load a considerable distance outside the centre of gravity of the rail-base.

Mr. Sayre has kindly sent me a piece of the Mauch Chunk rail. The radius of corner curve, as worn by the wheels, is precisely 7/16 in. for an arc of 3/4 in. chordal length, fulfilling my prediction that this rail would be found no exception to the general rule. The web shows a permanent outward set, which is also exhibited by a piece in the possession of Mr. John Fritz, of the Bethlehem Works. On the other hand, Mr. Sayre has several specimens which are not distorted. From such evidence as I could obtain at Bethlehem, I understand these pieces to have been cut from one bar, in a vertical slotter, and while it is possible that the distortion was effected in the rolling mill, my believe is that the web was sprung in service, partly by the unusual thrust, and partly by an outside application of vertical pressure brought about by the wearing away of the head. That some pieces show no springing may be accounted for by supposing them to have been taken from near a joint, where the rail was supported by the heavy angle-bar. Mr. Sayre does not agree to this opinion, and, perhaps, the question has little importance, as the circumstances were altogether abnormal.

Apart from strength, we may some day have occasion to inquire as to the extent and effect of lateral springing, within the elastic limit, under the thrust of high-speed trains. As a lateral deflection of .096 in. in the middle of a 6-ft. length will correspond to the ordinate for a 10° curve, there is a possibility of sensibly affecting the alignment. Mr. Fritz suggests that a certain elasticity is necessary, or, at least, desirable. It seems to me that we can afford to allow very little, and certainly had very little with the old pear-head rails. Such weighty testimony as Mr. Sandberg offers, in explanation of his action in increasing the percentage of his web-metal, should be seriously considered. Unless, however, there is something in the behavior of beams under impact which should further modify our designs, I still think that his metal might be better disposed. Our ordinary method of calculating the deflection of beams gives no clue to the ability of the web to transmit stresses to the flange. Mathematically the web may be merely a line. It has already been pointed out that in Mr. Sandberg's sections the plane of minimum resistance to lateral thrust is so far down as to incur a severe combined stress. Is it not very probable that the deformation at the joints, which he experienced with thin-webbed rails, is due to a longitudinal compressive set, taken by the fibres at this same plane, where all the web stresses reach a maximum?

Right here an explanation, which should have been in the text of this paper, will be appropriate. It is not desirable that the resistance of the web to lateral thrust alone shall be absolutely uniform from the neutral axis down, as would be the case if the load were always centrally applied, and no difficulties were to be encountered in the rolling-mill. When the vertical load is out of centre a certain distance, it acts, with a leverage equal to that distance, to develop a lateral bending-strain in the web, which reaches its maximum where the web is thinnest. This is one reason why the thinnest place should be located where all other strains are lightest, viz., at the neutral axis. * * * Nothing revolutionary has been attempted in the design of this web. Besides the Irish rail, I have been presented with evidence to show that other rails have been rolled of somewhat this form; but none of them have approximated the required conditions, which are: 1st, a web resistance to lateral deflection, at or near the lower fillets, equal to the demands of experience; and 2d, resistance, from the neutral axis down to the fillets, as nearly uniform as due regard for the requirements of the rolling mill will permit. The first of these requirements is paramount, because it is a condition of safety; and Mr. Sandberg is quite right in insisting upon it. The second is a condition of economy; and the precise question is, whether it can be secured without sacrificing the first. It is not necessary to my argument to claim that, if the weakest part of a rail is strong enough, superfluous metal in other parts actually weakens the rail; for it is plain that *for a given weight* the best distribution of metal gives the greatest strength and durability. Thus the condition of economy becomes in another view a condition of safety. What I claim to have demonstrated is, that by a re-design of the web the best American pattern now in use of 68 pounds and upward can be stiffened both vertically and laterally, some 4 or 5 per cent.; without an increase of weight. But I do not insist upon the precise dimensions herein given.

In the connection there used, I can cordially indorse Mr. Sandberg's remark, "mathematical formulæ are very well, but let them not be used to justify light weight." Our railway managers as a class, and even some of our technical writers, have been slow to admit the full force of recent changes in traffic conditions in their bearing upon the endurance of rails; and the mills have at times had to suffer unjustly in consequence. My object in calling to aid mathematical demonstration has been to lift the question out of the region of disputed assertion. The usual order in such matters has prevailed. We had a store of observed facts. These are now shown by analysis to be harmonious and reasonable.

TECHNICAL.

The Car Shops.

The Newport News & Mississippi Valley Co. (Chesapeake & Ohio route) has recently received 12 new passenger coaches built by the Pullman company.

The Atchison, Topeka & Santa Fe is having four vestibule trains built at the Pullman works. They will be used between Kansas City, Mo., and Los Angeles.

The owners of the Huntingdon Car Works, which have been idle for three years, have been offered a price for the plant by a company representing wealthy capitalists in New York, Philadelphia and Baltimore. Among the number, it is said, is Austin Corbin and Joseph Sully. In addition to the present grounds the purchasers desire eight or ten lots for increased storage capacity, and expect the citizens of Huntingdon to donate the ground.

A handsome passenger coach has been turned out by the Wason car shops for the Central Vermont Railroad. It is lighted by electricity generated by gearing from the wheels.

Bridge Notes.

The Keystone Bridge Co. began at Freeport, Pa., on the 20th to put a new iron railroad bridge across the Allegheny River at West Penn Junction, which is to be completed in 90 days.

Manufacturing and Business.

Henry Disston & Sons are running their works at Tacony, Philadelphia, with a force of about 2,000 hands. They report a very active demand for saws, particularly from the foreign trade.

The Armington & Sims Co., Providence, R. I., built for Edison plants last year 7,000 horse power of engines. This year the average daily output of the works has been 65 horse-power.

Iron and Steel.

The contracts for the iron work of the new cable road to be built in Pittsburgh were awarded on the 28th ult. to Riter & Conly and Oliver Bros. & Phillips, of Pittsburgh, Pa. Work will be commenced at once on these contracts, which amount to about $750,000.

The rolling mill of the Maiden Creek Iron Co. at Blandon, Berks County, Pa., will be offered for sale some time in July.

Bingham & Taylor, proprietors of the Clinton Iron Works, of Buffalo, N. Y., are about to build a new foundry in that city. About 100 men will be put at work at once, and it is intended to have the building ready for occupation by the 15th of July. Joseph Metz holds the contract for carpentry and Jacob Beier for masonry. The building complete will cost in the neighborhood of $50,000.

The Springfield (Ill.) Iron Co. has recently added Bessemer converters to its open-hearth plant, and is now contracting for July delivery of steel rails. The company's capacity for splice bars is 4,000 tons a month.

The Tuscaloosa (Ala.) Coal & Iron Co. has given the contract for building a 100-ton furnace. The contract was awarded to H. W. Hargreaves, now engaged in putting up four furnaces for the Tennessee Coal, Iron & Railroad Co., six miles from Birmingham.

The Rail Market.

Steel Rails.—There is no business reported. It is rumored that a sale of 10,000 tons of foreign rails has been made to a Southern road. Quotations, $38@$39 at Eastern mills.

Old Rails.—The market brightened up at the beginning of the week. There are various sales reported; 1,000 tons of foreign tees at $21, 300 tons of tees at $21.50, 4,000 tons of double heads at $22.50 and 1,000 of the same at $22 25. There have also been a sale of 2,000 tons of American tees at $22 and 5,000 tons of double heads for shipment at private terms.

Scrap.—The market is still very dull, with little foreign from store offered, and yard scrap quoted nominally at $21@$22.

Rail Fastenings.—Spikes, 2.40@2.50c. net; angle fish bars, 2.10@2.25c.; steel angle bars, $2.20@$2.30; bolts and nuts, 3@3.20c.; and bolts and hexagon nuts, 3.20@3.30c.

Frost Dry Carburetter Lighting System.

The New York Board of Fire Underwriters have finally and formally approved of the safety of the Frost dry carburetter system of lighting cars as used on the Pennsylvania Railroad and manufactured by the Railway Lighting & Heating Company, of Philadelphia. The company have filed a bond with the Board of Underwriters to make and apply their apparatus in accordance with the plans heretofore submitted, and whose safety has been approved. The company are equipping the new parlor cars for the West Jersey division of the Pennsylvania Railroad, and are just completing the work for 10 new cars for the Norfolk & Western. Their shops are full of work with orders on hand.

Engineers' Society of Western Pennsylvania.

This society, together with the Society of Architects and the Amateur Society of Photography, will make an excursion June 24 by steamer from Pittsburgh to Brownsville and return.

The Tay Bridge.

June 20 was set as the day for the opening of traffic over the new Tay bridge.

The Mann System of Ventilating Cars.

On June 22 a Mann Boudoir car was run from the Grand Central Depot to Stamford, Conn., and return, carrying the New York State Commissioners and a party of railroad men, in order to show them the workings of the system of ventilation devised by Col. Mann, and which is in general use on his cars. By this system the external air is taken in by a hood on the roof, passes down through a flue, the lower end of which opens over a tank of water. The momentum of the larger cinders and other particles carried in with the air projects them into the water tank, where they remain. The air goes from the surface of the water up through a screen of excelsior. This excelsior is kept moist by the drippings of melted ice, placed on a grate above it, which also replenish the water in the tank. After passing through this screen the air goes an air into tight chamber, in which stands a Baker heater in the winter, and which is filled with ice in the summer. From this chamber the air goes by a conduit along the base of the wall of the car. This conduit is pierced with register holes, increasing in size as the distance from the air chamber increases. In this conduit also are carried the ordinary circulation pipes of the Baker system of heating. Of course the purpose of the apparatus is obvious. The larger foreign particles are caught in the water tank, and all the finer dust which remains in the air is caught in the excelsior screen, the rough surface of this material seeming to adapt it particularly well to this use. On the trip mentioned, very careful observations were made of the temperature inside and outside of the car, as well as of the hydrometric condition of the air. The day was very sultry; the mean temperature outside was about 82° F. The temperature of the air on issuing from the register was about 62° F., and the mean temperature of the car was maintained at about 75° F. There was no dust or gas perceptible in the car.

The Canal Between the Volga and Don Rivers.

The Russian government have approved, in principle, of the plan for connecting the Volga and Don, according to *Engineering*. The canal starts from the Volga at an elevation of 7 ft. below that of the Black Sea, and joins the Don 112 ft. above it. The canal is to be about 35 miles long, with locks which will hold two vessels each 210 by 42 ft., with 7 ft. draft. As it will connect the navigation on the Volga and Caspian with the Black Sea, it will doubtless have a great deal of traffic.

Petroleum Fuel for Locomotives.

It is said that the Pennsylvania has recently run a petroleum burning locomotive between Pittsburgh and Altoona with good results. The devices used are said to be new, the invention of a Russian. Experiments in the same direction are now going on, or were very lately, in the yard of the Manhattan Elevated.

Arthur Kill Bridge.

The contract for the foundations and masonry of the Arthur Kill Bridge has been awarded to Messrs. Boller & McGaw, who commenced work Monday, June 20. The foundations will be put in by means of coffer dams in from 20 to 30 ft. of water, at which depth rock bottom is reached. The draw-span is to be 500 ft. long and will practically cross the Kill. There will be an approach span on either side of about 150 ft. The grade will be 34 ft. above high water.

Aluminum Steel.

Some important and very satisfactory experiments have been made at the Cleveland Rolling Mill Company's works lately in treating Siemens-Martin steel with small percentages of aluminum manufactured by the Cowles Electric Smelting and Aluminum Company, of this city. The result of the work proved conclusively that a small quantity of aluminum freed the steel from blow-holes, and increased the tensile strength somewhat without decreasing the elongation, besides adding very materially to the fluidity of the bath, thereby producing much sharper castings. It has not yet been determined how small percentages of aluminum are necessary to secure the required products, but from one-tenth to one-twentieth of one per cent. gave satisfactory results. The castings made showed a tensile strength as high as 140,000 pounds to the square inch. The alloy was applied in the form of broken ferro-aluminum. Experiments are now in progress with puddled iron, and when these are completed we hope to give a more definite statement of the results reached. The Cowles Electric Smelting and Aluminum Company is now delivering to the Whitehead Torpedo Company, of London, England, a number of aluminum bronze castings, averaging 1,500 lbs. each, and intended for use as air cylinders, being required to stand a pressure of 1,000 to 2,000 pounds to the square inch.—*Cleveland Iron Trade Review.*

Storage Batteries.

The *Electrical World* of June 18 gives a description, with illustrations, of the works recently built in Newark for the manufacture of storage batteries. These works are capable of turning out over 500 cells a week. They have a 200 horse-power engine and ten dynamos, and are run night and day. These few facts are sufficient to indicate the tremendous advance made in this form of electrical application within the last few years, or months, one might say.

Bridges on the Pennsylvania.

Master Carpenter Webb, of the Pennsylvania road, has just moved the large bridge at Johnstown, Pa., so that travel would not be interrupted during the building of the new stone arch structure that is to replace it. The work was done in 10 1/2 hours. It required 75 carpenters and 100 laborers to move the bridge. Not a roller was used, but the work was entirely accomplished with the aid of greased rails. The bridge is 400 ft. long. It was moved 52 ft. from its original position at the west end, and 47 ft. at the east end. The next bridge to be moved will be the one at Summer Hill, between Cresson and Johnstown. It is 278 ft. long.

The Springfield Iron Company Bessemer Plant.

This company, which in the days of iron rails was among the largest producers of rails in the country, has just added two 5-ton Bessemer converters to its plant and proposes to produce 10,000 tons of steel per month, commencing in July. Their present capacity is about 6,000 tons of finished iron, splice bars, bolts, car truck iron, etc., and 2,000 tons of open-hearth steel, employing at present about 1,100 men. The works are at the mouth of their coal mine, between the Chicago, Alton & St. Louis and Wabash railroads, about a mile north of Springfield, and cover 55 acres.

A Passenger Car Ventilator.

President Harris, of the Vermont Valley road, is the inventor of a new system of car ventilation. The theory is to make the car self-ventilating, and to illustrate his idea Mr. Harris has had such a car built. A double roof is used with a space of about 6 in. between. The air enters between the roofs through a screen, is carried down a tube which narrows as it approaches the bottom of the car. The reason for narrowing the tube is to prevent the air from escaping while at the same time the cinders are shot under the car. The air itself entering the tube in such large volumes cannot escape through the small opening, but is forced back and out of ventilators that are provided at the side of the car. These with the suction ventilators keep up a constant current, and the air is rendered pure and free from dust. On the trial trip the ventilator was thoroughly tested by attempting to fill the car with smoke, and by stopping up the air tubes to see how much coal dust was deposited, and it was found to work satisfactorily. This new car has also two windows, attached to which are double screens. These screens appear when the windows are opened, and are so arranged that the dust and cinders which force their way through the outside screen are at once forced back by the air current.

A New Kind of Fuel.

A 23-ft. vein of what promises to be a valuable kind of fuel has been discovered at Elsinore, Cal., and it is thought that the whole valley is underlaid with it. It is described by the *News* of that place as quite soft, and easily worked when in the mine, but it gets hard when exposed to the air. It resembles slate somewhat in appearance, although of a somewhat lighter color. It is clean, leaves no marks or stains on the hand, does not slack or crumble in the air, can be split like mica into very thin fibres, burns freely, and needs only to be ignited with a match, smells like burning rubber when being consumed, and leaves behind a jet black ash resembling lampblack in all its properties. It is said to be worth $15 per ton for making gas.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The article on Electric Signals, which is published in another column, will be found valuable to those whose knowledge of the subject is but vague, and interesting to those who are more accurately informed. It is by the electrical engineer of the Boston & Albany. There is not another road in the country where it would be possible to gather the same amount of experience in the use of automatic block signals. Mr. Blodgett's testimony concerning the value of the overlapping feature and the practicability of it, are especially interesting, because track-circuit signals cannot be made satisfactorily safe and trustworthy without it; so long as enginemen are required to stop *before passing* a signal, runners of fast trains will be always on the anxious seat during fogs and thick snow-storms; the better plan of giving them room to stop after passing a signal is the only rational one for such trains, and removes the superintendent of much anxiety also. This seems attainable with automatic electric signals only by the use of a line wire, so that the results of all experience with line wire circuits should be carefully noted. With all the wonderful advancement in electrical science during the past dozen years it ill becomes railroad officers to relax their efforts toward utilizing electricity in this or other departments.

Elsewhere will be found some additions, in the form of a discussion, to Mr. Mattes paper on Rail Sections, now well known to all interested in the topic. It will be seen that Mr. Mattes has made an experiment to show that one-eighth of an inch is not sufficient thickness for the web of a rail. No one ever said it was. All that we said, or that Van Weber showed, was that the web might be thinner than the present practice, but no one knows how much thinner, and really it seems worth while for some one to set to work seriously to find out. As for the lesson from the section of the Lehigh Valley flange-worn rail, now also well known, Mr. Mattes omits to mention that at least *one* cutting from that rail shows an inward instead of an outward set. In other words, the present form of the section of that rail shows nothing at all as to the effect on the web of severe and often repeated outward thrust. The argument for the beveled side of head, that it "serves a useful purpose in maintaining the gauge and the width of head against lateral wear" is almost as good as the proposition of another designer to mae a 30° fishing angle. The assertion that "our railroad managers as a class have been slow to admit the full force of recent changes in traffic conditions in their bearing upon the endurance of rails" is too comprehensive. As a class they probably realize only too well, and admit freely the force of these changes, but as a matter of fact they are having hard work all around to keep up with them. It is a question of finance rather than of intelligence or candor. It is only the rich man who can be really economical, and the axiom is just as true of railroads. But we will not quibble over Mr. Mattes' words. He has made a valuable contribution to the study of the subject, and has stimulated thought and discussion.

Mr. Forney's report to the Master Car-Builders' Association, on safety appliances for freight cars, while giving little that is new, emphasizes the fact that the responsibilities and duties connected with the subject are still in force, whether we see any change in the aspect of the question or not; and he has done a real service in reminding the Association that there are plain paths in the line of reform that may be pursued by individul companies in spite of the backwardness of others or of non-action of the convention. The discussion that followed the report showed very clearly the direction of these paths. Putting on grab-irons by the hundred for foreign roads and then having to fight for your pay is not very encouraging business; it is much pleasanter to be inventing a new coupler that will revolutionize the world; but Mr. Marden has done a very useful service, nevertheless, and a service that must be done by somebody, if the dangers of the brakeman's avocation and the consequences of brakemen's carelessness are to be mitigated by the means mentioned before the Association. The freight brakemen, on an old road like the Boston & Albany, are probably as careful a set as could be found anywhere, and yet we see by Mr. Adams' testimony that they make a good many misteps. Innate recklessness is hard to cure, and the Association is not bound to attempt impossibilities; but besides providing guards and extended running boards for those who are disposed to avail themselves of them, the education of reckless persons into more careful habits by placing safety appliances where they will be tempted to use them should not be forgotten. Brakemen's disinclination to use sticks with which to couple, which is said to virtually defeat the adoption of that means of safety, is largely a matter of pride; but making use of a hand rail in stepping from one slippery car to another on a dark night would not expose a man to ridicule so much as the making a coupling before a half dozen "old timers," and the only temptation would be perhaps to lie about the occurrence when telling of it the next day.

The proportion of switches provided with interlocking apparatus in Great Britain and Ireland, reported annually by the Board of Trade was, at the end of 1886, 88 per cent., as compared with 87 per cent. a year previous; and yet this small percentage of increase represents 1,260 new interlocking machines. Of the 18,338 miles of road in the United Kingdom open for passenger traffic 14,639 are worked by the absolute block system, 76 by the permissive block and 2,365 by the train-staff system. The percentage of double track worked by the absolute block is substantially the same as in 1885, six lines having made slight additions which change the total (93) but a trifle. Eighty-five per cent. of the passenger stock of the United Kingdom is equipped with continuous brakes, though only 53 per cent. has apparatus approved by the Board of Trade. Both these percentages are slight increases over the previous half year. The onerous nature of the obstacles that have constantly to be contended with in the working of heavy traffic like that on the Great English roads is evidenced by the figures, referred to in our last issue, giving the stops on the London, Brighton & South Coast from unexpected causes for a single day. The date was Dec. 4, 1886; regular stops, 8,380; by signals, etc., 10,627. From this report we also learn that on the above mentioned road during the last half year four accidents were prevented by the use of the Westinghouse automatic; and of these four we are glad to be able to state that two were cases where the engineman reduced a high speed with great alacrity and saved from a horrible death—two packs of hounds.

THE COMMISSIONERS ON THE LAW.

On another page will be found an abstract of the decision rendered on the 15th inst. by the Inter-state Commissioners in the case of the Louisville & Nashville and other roads petitioning for relief. The substance of it is that the temporary suspensions of the fourth section will not be renewed after their expiration, but that henceforth, if a railroad company thinks reason exists for its relief from the operation of the law, it may act accordingly, and take the consequences. In other words, the Commission will not nullify the law. The companies are to take their places in relation to it as all of us have to do in relation to all laws; that is, obey it according to their lights, and break it at their peril.

There are, however, here the peculiar conditions that this law is complicated and doubtful in its provisions; that there is no accepted body of rulings and decisions under it; that if the railroads err in their construction of it they subject themselves to penalties, and that Congress has provided a body especially to aid in its interpretation and administration. It would seem, therefore, that this body should relieve the railroads by passing upon all doubtful points so far as it can. Ordinarily, if one party construes the law strictly against himself, he construes it liberally for the other party; but it happens in this case that a strict construction of the law may hurt the shipper more than the railroad, and yet it is dangerous for the railroad to make that construction which the real interests of the shipper demand. The document is in the main wise, and confirms the public confidence in the Commissioners themselves. It is only in its failure to take sufficiently into account these facts that it can be criticized.

But the Commission expresses its interpretation of some of the applications of the law for the guidance of the companies, and this interpretation will very likely, in general, be that of the courts. It is that competition with water routes and foreign roads constitutes such dissimilarity of condition as to warrant different rates; that competition between roads all under the federal law can seldom constitute such dissimilar conditions; that local traffic cannot be discriminated against in favor of through traffic, and that the companies cannot, under the law, undertake to favor localities for the purpose of building up industries or trade centres. Moreover, it is laid down that it is no purpose of the law to destroy legitimate competition.

The document clears a good deal of ground. For the last three months the conviction has no doubt grown in many minds that the restrictions on competition which would be imposed by a strict enforcement of the provisions of the fourth section could not be endured; that if the interpretations of the Commission and the courts should compel their strict enforcement, modifying legislation would be demanded. It is now apparent that within certain limits the construction of the law is likely to be such as not to interfere for evil with existing trade relations. But after all, this decision only touches, and with nothing like finality, upon the most complicated part of the matter. It was tolerably evident that the roads must be allowed to make special rates at points where they come into competition with carriers over which the Commission has no control, but the trouble is to regulate rates at points where the competition is between inter-state roads. These points, after all, are more numerous than those where the competition is with water routes alone, and at these points serious complications arise.

The Commission half promises to tell us later what competition is "legitimate" and what is "illegitimate," and probably their decision on the petition of the Pittsburgh & Lake Erie and connecting lines, as against the Pennsylvania, will not be long delayed. This is a typical case of competition between inter-state roads unaffected by water routes, and it is in its operation in just such cases that the law will have its greatest effect on the business of the country. The longer line will not be permitted to make rates to the competing point less than the cost of service, but how near actual cost may it come, and who is to decide what is the cost? The Commissioners conclude that in cases where there is water competition, if additional traffic "can be made to pay anything toward the cost above what the taking of it would add to the expense, the railroad ought not in general to be forced to reject it;" but in the case of a longer line against a shorter one, for the sake of securing that competitive traffic for which the line was built will it in any case be allowed to make rates just above cost at the competing point, and get such revenue from traffic to other points as will serve to maintain the property in efficient condition and pay some profit on the investment? In the unadjudicated case referred to by the Commissioners, the Pennsylvania route from Pittsburgh to New York is 444 miles, and that by the Pittsburgh & Lake Erie, the Lake Shore and the New York Central is 700 miles; while from Youngstown to New York by the latter route is 632 miles. So long as the Pennsylvania keeps within the law its shorter line will make it in its effect on the Pittsburgh & Lake Erie and connections a "water route" or a "foreign road." That is it can make its rates between Pittsburgh and New York higher than the old rates, and yet so low that its competitor cannot meet them while maintaining living rates to intermediate points, if the long-and-short haul is enforced. This, then, deprives Pittsburgh of the competition for which the newer line was built. It happens in this special case that Pittsburgh will prob-

ably not suffer; but, as we have said, the case is typical. It still remains to decide what are those "rare and peculiar cases of competition between railroads which are subject to the statute where a strict application of the general rule of the statute would be destructive of competition," and for the present the companies remain without guidance as to the opinion of the Commission.

Where the roads competing at a given point are so nearly equal in length and other conditions that the cost by one will be nearly that by another, the Commissioners, perhaps, will consider the competition legitimate and leave the roads to protect themselves from each other as they may, and the communities to enjoy that free competition which is to be the result of the prohibition of pooling; but when one competing route is 58 per cent. longer than the other, does the competition become "illegitimate," and is the less favored road to be debarred from the privilege of making special rates because of the "illegitimacy" of its competition? Or if the road which is 58 per cent. longer than another may still try to take away the traffic of the shorter line, at what point does the illegitimacy begin? Perhaps at that point where the rate which would secure the business is below the cost, to the longer line, of doing it. It is quite evident that this last decision of the Commissioners is but the beginning rather than the end of their special rulings.

Before the enactment of the law the pools were working toward the solution of this question. By differentials they attempted to determine the conditions of competition of roads having unequal facilities, and by maintaining rates at the competing points they were lessening the evils of discrimination against other points. The law as interpreted by the Commission and the courts must now provide the way to do what the roads were learning by costly experience to do for themselves. Perhaps it will, but if it does it will be one of the most successful pieces of legislation ever devised.

CARRYING GOODS AT OWNER'S RISK.

One of the items of cost in the transportation of freight is the percentage of loss from breakage of fragile articles and of fragile coverings on goods not especially breakable; from leakage of liquids when packages are poor or roughly handled; from damage by rain water or beer out of place; from carelessness which will occasionally creep in, and from numerous other things. Every railroad has a large yearly bill for items such as these, and is of course warranted in taking all reasonable means to keep that bill as small as possible. But, one of the complaints of the shippers who feel aggrieved at the new classification of the Trunk Lines is that the railroads overreach themselves in this matter of risks; that they have made prices which far more than make good all possible losses, and to that extent misuse the public; so that it is perhaps well to inquire into the facts of the case.

One of the simplest and most reasonable conditions of the transportation of any kind of goods is that they shall be well and sufficiently packed. Millinery in tissue paper wrappings or lamp chimneys in grain bags would be admitted by any one as proper subjects for the "Owner's Risk" clause; and few would deny that it properly applied to bananas shipped 500 miles as ordinary freight in summer, or to fresh fish started in the heated term for a two or three days' journey which involved several transfers. Many cases resembling these more or less distinctly will occur to any one interested in the subject. Express companies take anything, from an uncovered tub of oysters to a live tiger or rattlesnake; but the putting a messenger in charge of all goods constitutes a valid ground for distinguishing between express and freight service, and every one admits it to be such. Many kinds of freight, however, are of such weight, or bulk, or value, that the shipper often finds himself confronted with a choice; he can send his goods by express, unpacked, at a certain rate, or he can expend a certain sum for packing and send at a lower rate by freight; and as an additional complication the railroads, rather than have a drawn battle with each shipper as to what is and what is not proper packing for various kinds of merchandise, virtually offer to assume the functions of an express company themselves by naming two rates for the goods, one when the latter are really fit for freight, and the other for the more risky condition. It is in the adjustment of these rates that the injustice is alleged to lie.

Of course it must be remembered that in many cases this question is entirely swallowed up by the greater one of competition. Live stock, which is intrinsically express traffic, or at least high class freight, because of the necessity of traveling attendants and of avoiding delays, has been "cut" until it went at less than grain or lumber rates; and the recent article in these columns on the English Clearing House reminds us that similar conditions exist over there. One party or locality pays high rates to get the carrier to assume risks, while at another place the carrier not only assumes the risks, but makes other large concessions besides. The present practical bearing therefore is confined within narrow lines.

What the merchants would like would be to have the roads fix a reasonable rate on, say, brittle stove castings well boxed; and then add, for those unboxed, just enough to make the probable traffic pay an amount equal to the average actual loss from breakages: in other words, to simply make good their losses. The railroads, on the other hand, desire to not only cover their losses, but to charge enough profit on this insurance branch of the business to induce the shippers to either box the goods or else send them by express. Whatever may be the superficial aspect of the case, this is its essence. If the roads generally would provide an adequate express freight service, there would be much added reasonableness in the position they take. The rational plan on which freight should be carried is the same as that generally recognized as right for passengers; to take all reasonable precautions for delivering the goods at destination in safety. To ship a thousand stoves unboxed, with the understanding that a certain percentage of them will be sure to come out broken is unscientific and unnatural, and the railroads in trying to remedy the matter must be admitted to have a good degree of common sense in their favor. They can with much reason claim that goods which cannot possibly be put in good riding condition, as for instance boxes of delicate plants, or casks of beer in hot weather, should justly be insured by the owner and not by the carrier.

There is a specific ground of complaint, however, and one that is emphasized by the *Iron Age* in a late editorial on the subject, in the way in which the relations of the parties are adjusted under the present regime. Many shippers say that they would willingly accept the conditions offered by the railroads if they were assured of receiving uniformly just treatment. The case is this: The carrier takes a certain shipment at owner's risk; which means that a case of paper wet through an undiscovered leaky roof, or a carboy of acid broken and spilt by a bit of an extra bang in switching the car, must be accepted without complaint by the consignee. But wetting goods by carelessly leaving them out in the rain, or breaking them by gross negligence in handling a train are sins that the carrier must settle for; the judges say that he cannot contract to relieve himself of their penalty; and the shippers say that they are unable to find out which of these classes of causes is to be charged with specific cases of damage. Unscrupulous traffic agents can conceal or make difficult of access all evidence of fault on their part, and thus defraud the public; in fact the same injustice may be done without any very wicked or intentional concealment; mere selfish indifference or inaction where a case should be investigated and honestly owned up, will do it.

This is a true bill against the railroads, and they should meet it. Admitting that only a small fraction of them cheat their customers in this way, it is to the interest of all to place themselves above suspicion in the matter, so far as possible. In the nature of the case the conditions of the contract with the shipper are proposed by the roads, and excess of cautiousness which leads to the wording of every clause as though it assumed the shipper to be a highwayman constantly tends to make the public desire legislative regulation. Satisfying patrons in this matter is not, perhaps, very easy; but satisfaction is their due, nevertheless. If a law were enacted that "O. R." goods delivered in bad order should be accompanied or followed within three days by either an offer to pay for the damage, or an affidavit from each man who had charge of the shipment during transit that he had observed due care in handling it, the roads could find very little fault; and it would seem to be to their present interest to behave so well that no one will ask for such a law.

Water Communication between the Mississippi and the Great Lakes.

The annual report of the St. Paul Chamber of Commerce for 1886 contains a paper by General C. C. Andrews, of St. Paul, on the subject of water communication with the great lakes.

The people of St. Paul, and in fact those living on the upper part of the Mississippi, have long urged the necessity for a navigable connection with the lakes. It was hoped for some time that the Fox and Wisconsin rivers improvement would be completed, but the late developments of the railroad system in the region have reduced rates so low that it is doubtful if an ordinary canal could compete to further reduction over the route from Green Bay to the Mississippi; and at any rate it is thought proper to defer any further action on that project until the practicable low-water depth to be maintained in the Mississippi is determined, as that should govern the capacity of the canal.

In 1874 or 1875, Mr. George R. Stemtz, an engineer of Duluth, proposed a steamboat canal and slack water navigation by way of the St. Louis and Mississippi rivers, Red Lake and the Red River of the North to Lake Winnipeg, the Dalles of the St. Louis River to be surmounted by an inclined plane. The plan also included the improvement of the Mississippi down to St. Paul, the present head of navigation. The realization of this scheme would have connected the waters of the Mississippi with those of Lake Superior, and both with the navigable waters of Manitoba, which would to some extent solace the inhabitants of that country for their inability to build railroads towards our border.

It is doubtful if a thorough survey has been made over this route, and now the citizens are turning their attention to a proposed improvement of the St. Croix and Bois Brule rivers, or of the St. Croix and Left Hand rivers, into Superior Bay. The first route is 165 miles long against 200 miles for the second, but there is no harbor at the mouth of the Brule. Fifty-eight locks, 300 × 75 ft., with 12½ ft. lift, are estimated for, and the cost is assumed as 8 million dollars.

It is contended that, instead of a cost of from 5 to 7 cents per bushel for grain, as now, it can be carried by canal for 2 cents, and return coal, etc., at 60 cents per ton, instead of $2.50, as at present. As the Erie Canal is 352 miles long, with 72 locks, with an average lift of 9 ft., to which is to be added 140 miles of river navigation, and the freight over this waterway averages but little over 4 cents per bushel, the estimate of 2 cents does not seem to be much out of the way, considering the fact that the canal is projected for steamboats of the size used on the river.

The old project of the canalization of the head waters of the Red River of the North and the Minnesota is referred to. If there was water enough in the Minnesota or if rain enough fell about Lake Traverse and Big Stone Lake to make the route practicable, without building a canal the length of the Minnesota, few routes would offer more local traffic. But for a through route it lacks the directness of the route by Red Lake or of another possible route by the Crow Wing River.

Very little is said of the Hennepin Canal, which, with its proposed excessive lockage and inability to take a boat wider than 30 ft., can be of but small service to any part of our country.

Our government engineers, in dealing with canals connecting navigable rivers, seem inclined to limit their sizes by the least navigable depths of those rivers. This is not the view taken by Col. O. M. Poe, in recommending a depth of 21 ft. for the new lock at the Sault Ste. Marie, while the Limekiln crossing has only about 15 ft. on it at present. Nor is it the view taken by European engineers, with whom, according to Sir Charles A. Hartley, "The permanent acquisition of even a single foot of additional depth between great trading ports in the same or adjacent river basins is considered of immense importance, and worthy of being attained at great cost."

From the same report the following figures of the growth and business of St. Paul are taken:

Special attention is called to an effort inaugurated in the preceding year to increase the capital devoted to manufacturing, which resulted in an addition to that capital of more than 4 million dollars, 3¼ million of which is invested in a stock yard and allied interests, and $200,000 in the Edison Electric Light & Power Co. Though this investment has not yet been effective, the number of hands employed in manufacturing were 18,958, and the total value of the product was $31,043,000. The wholesale business, employing 7,372 people, amounted to $84,188,000.

The population has increased from 50 in 1847 to 125,000 in 1886.

The banking capital and surplus of Minnesota is $20,208,908, of which St. Paul possesses $7,887,600.

There were in St. Paul 11,443 transfers of real estate for $27,826,633 in 1886, an increase of nearly 100 per cent. over the business of 1885. About $10,000,000 were expended in building improvements, 3,570 building permits having been issued; 831 of these were built by the aid of 37 building associations, which have an aggregate yearly income of $1,200,000.

The result of a careful inquiry as to the price of lots in various cities is given below in cost per front foot:

	Most valuable business property.	Cheapest business property.
Chicago	$6,000	$300
Cincinnati	3,000	150
Louisville	1,200	40
Cleveland	3,000	100
St. Louis	2,500	200
Denver	750	100
Kansas City	1,750	60
Milwaukee	1,750	75
Omaha	1,000	75
Minneapolis	1,200	100
St. Paul	900	75

The railroads in the territory of which St. Paul and Minneapolis are the centre, report a new mileage for 1886 of 2,486 miles against 660 miles in 1885, or 37 per cent. of the new mileage of the country in 1886 against 25 per cent. in 1885. The Manitoba system was increased by 379 miles; and the next greatest additions were made by the Chicago, Burlington & Northern, the Fremont, Elkhorn & Missouri Valley, the Minnesota & Northern and the Minneapolis & Pacific, each of these companies opening over two hundred miles. The expenditures on this new mileage and the betterments of the roads amounted to over $50,000,000. These

roads brought to St. Paul 122,381 car loads of freight and carried away 74,267.

The Strong locomotive, No. 444, which, as noted in our last issue, made a trip from New York to St. Paul last week, made the following remarkable run over the Pittsburgh, Fort Wayne & Chicago, from Fort Wayne to Chicago, June 20. The facts are given by A. H. Pollman, road foreman of engines, and C. H. Walton, Trainmaster.

"Train No. 3, June 20, 1887, Fort Wayne to Chicago, 148 miles. Train consisted of one baggage, five passenger and four Pullman (sleeping) cars. Total, 10 cars, weighing about 550 tons. Running time, 225 minutes, including 23 stops; also there were five bridges where the speed had to be slackened. One stretch of 9.5 miles was run in ten minutes, another of 8.7 miles, including one crossing, in 9 minutes. The train was hauled for three miles up a grade with the brakes accidently set on one of the Pullman cars."

The facts given are not minute enough to enable an exact comparison with other fast runs to be made, but there seems to be no doubt that this was an exceedingly good performance. The weight given, 550 tons, would seem somewhat too high, 330 tons being a liberal allowance for average cars of the kind named; adding 110 tons for engine and tender would make only 440 tons for the entire train. A considerable distance in the suburbs of Chicago has to be run at a low rate of speed, and the length of the stops at stations is, of course, variable. This is a night train, and probably makes stops of less than one minute at many of the stations. The Official Guide shows only ten regular stops between Fort Wayne and Chicago; allowing one minute for each of these, and two minutes for times lost at each make thirty minutes; then allowing, say one half minute for each of the other thirteen stops, and two minutes lost at of these also, we have one hour and three minutes consumed by the stops. Allowing ten minutes for the reduced speed entering Chicago, and two minutes each for each of the bridges mentioned in the report, makes the total something like one hour and twenty-three minutes to be deducted from the three hours and 45 minutes given as the total for the run. This brings the average rate for the time while the train was under headway well up to 60 miles an hour, which for a train of 10 cars is doing excellent work. In the fast run on the Chicago & Atlantic, from Marion to Chicago, Sept. 1, 1886 (reported in the *Railroad Gazette* of Sept. 24), the last 142 miles was made in 230 minutes, but the train consisted of only 6 cars. Of this 230 minutes about 31 per cent. was used up in stops; in the Fort Wayne run we have allowed 37 per cent., including the time used in reducing and regaining speed. The regular time of the Fort Wayne train is 5½ hours; almost 50 per cent. more than the Strong engine used.

The frequency with which trains have been "held up" lately in the Southwest by highwaymen suggests the necessity of measures for protection other than reliance on the local officers of the law. The good old-fashioned precaution of a double-barreled shotgun, here and there, handy for the trainmen to get at, would discourage the "agents" amazingly. About every tenth American male of middle age has at some time in his life ridden through the Port Neuf cañon (or some other) with a shotgun on his knees ready for the "road agents." Is it possible that the ability to take care of oneself is passing away with the stage-coaches? A couple of short, heavy double-barreled shotguns in the cab, and two or three more in the baggage and express cars, would stop the train robberies in short order. The "James boys" and their kind thoroughly dislike buckshot. Revolvers have little terror for them, but they can't stand the thought of being filled up with buckshot.

The New York Central and its connections are arranging to check baggage from "residence to residence" in New York, Boston, Saratoga, Buffalo, Detroit, Cleveland, Cincinnati, Indianapolis, St. Louis and Chicago, charging $1 per piece for the service, the same as the Pennsylvania has asked for similar accommodation at a few large places for some time past. To a considerable share of the traveling public this is a welcome convenience, the paying at once for the transfer at both ends of the journey, the uniform price, the reliability of the service and the relief from care or detention at the terminus being considerable advantages. But to those whose locality or other circumstances enable them to get transportation for both themselves and their baggage for 50 cents or less in each city, and whose time is not so valuable, the old plan is more attractive.

A late number of the *Evening Sun* announces that "The Brazilian Government is going to pursue the *extraordinary course* of advertising in this country for proposals for river and harbor improvements in Brazil. The Minister to the United States and the Consul General in New York will have charge of letting the contracts for the Brazilian Minister of Agriculture, Commerce and Public Works." The *Sun* which "shines for all" would not have shown ignorance of the fact that the Brazilian Government has been in the habit of drawing on this country both for engineering skill and material for many years.

It is announced, in our news columns, that the Denver & Rio Grande has made preparations for change of gauge, which will give it 523 miles of standard gauge, including 160 miles of new road. Probably this is but the beginning of a change of the entire line; but over 1,000 miles of narrow gauge will still remain in the Denver & Rio Grande system, between Ogden on the west, and the longitude of Denver on the east, so that it does not seem likely that the complete change will be made for some years yet.

The accidental omission of the word "not" from a sentence in the middle of the second column of page 396 of our last issue made a material difference in the sense of the report of the Burlington sub-committee on electrical features of brakes. What the committee said was, that "the valve construction, as shown by Mr. Carpenter, is certainly not more delicate and complicated than the Westinghouse triple valve."

Record of New Railroad Construction.

Information of the laying of track on new railroad lines in 1887 is given in the current number of the *Railroad Gazette* as follows:

Columbus, Hocking Valley & Toledo, Brush Fork branch, to Brashears, O., 2 miles.

Louisville, Cincinnati & Dayton, from Hamilton to Middletown, O., 13 miles.

St. Paul, Minneapolis & Manitoba, 13 miles west of Fort Buford, Dak., about 53 miles since last reported.

This is a total of 68 miles for the week, making 1,688 miles reported thus far for the current year. The new track reported to the corresponding date for 16 years has been:

Miles.	Miles.	Miles.	Miles.
1887.....1.688	1883... ..1,966	1879..... 761	1875..... 407
1886.....1,271	1882.....4,166	1878. 606	1874..... 637
1885..... 677	1881.. .. 1,972	1877..... 618	1873.....1,408
1884.....1,104	1880.... 1,899	1876..... 673	1872.. ...2,491

This statement covers *main track only*, second or other additional tracks and sidings not being counted.

NEW PUBLICATIONS.

The Official Railway Equipment Guide is now the name of the valuable monthly periodical managed by Mr. S. P. Sechrist, of Cleveland, Ohio, which gives very complete lists of the car equipment of the railroads and private car companies of the country, together with a large amount of other information of value to car accountants and other railroad officers. The June number has a view of a freight car equipped with a brake lever which can be worked by a man on the ground; in switching such a device is often the means of saving a good deal of time. The car in the cut is manned by two very well dressed brakemen; and a portrait of one of these brakemen's best girl is shown on the opposite page. Mr. D. F. Maroney, Manager of the Car Record office of the Baltimore & Ohio and a prominent member of the Car Accountants' Association (to which he has contributed some valuable papers) is now associate editor of the *Equipment Guide*.

The *Transactions* of the American Society of Civil Engineers for April, 1887, contains an article on Anchor Ice in Water Mains and Discussion, and one on the Determination of the Size of Sewers.

English Railroads—Their Administration, and the Status and Duties of Executive Officers.

III.

In a previous article has been shown how closely interwoven are the operations of the Railway Clearing House with the detailed daily administration of British railroads.

American railroad managers have been justly criticised for not having a railway clearing house, as English managers have been for their inefficient system of baggage checking for passengers' luggage. Doubtless these drawbacks will disappear in time as the railroad men of each country become better acquainted with the methods and appliances of the other.

Already the two leading railroad companies in England the London & Northwestern and the Midland, have commenced the American plan of checking the luggage of passengers arriving at Liverpool by transatlantic steamers. The first named company gives a brass metal check and the other one a paper ticket, but both companies couple with it an improvement on the American plan, inasmuch as at the time of giving the check the English officer issuing it books the luggage to its final destination (hotel or otherwise) in London or elsewhere, whereas in America this usually involves two operations, the passenger surrendering his check and giving final directions, when nearing his destination, to the express agent who boards the train.

These improvements, though fragmentarily and tardily adopted by English railroad men, owe their inspiration undoubtedly to the visits during recent years of several leading railroad officials to the states and Canada. The study of American railroad working is becoming a necessary part of a first-class English railroad manager's business equipment; and any superior points of excellence to be found in the new country will in future not remain long unknown in railroad circles in England. This policy of familiarizing English railroad men with American railroad methods, receives great official encouragement and support from enlightened chairmen. The boards of directors of some of the companies over which he presides have voted leave of absence and provided the funds out of the companies exchequers to enable their managers and engineers and other officials to visit America. A sojourn of two or three months enables them to get over a pretty good extent of country, which, with the aid of copious introductions and free passes on saloon cars, they see to the best advantage.

Among the results of Sir James Allport's visit to America were the speedy introduction on the Midland Railway of the Pullman car, the abolition of second-class carriages, and the closer approximation of first and third-class passenger fares. In return probably we shall have American railroad managers introducing or extending the block and interlocking systems of signals and switches, laying down better tracks and accelerating the speeds of passenger trains; prohibiting the overcrowding which perennially distinguishes railroads like the Manhattan; publishing uniform and plain systems of half-yearly accounts; settling freighters' claims for lost or damaged goods in something less than from two to three years of the presentation of the claims; and finally, and chiefest among a hundred other points in which English railroads claim to excel over American—the foundation of a Railroad Parliament and a Counting House, viz.: the Railway Clearing House.

To the passenger in America the existence of such an institution, by enabling through bookings to take place anywhere from the Atlantic to the Pacific, or from Minneapolis to New Orleans, would simplify if not abolish those complicated and elaborate series of tickets and coupons, checked and rechecked at intervals, which are at once a bewilderment and a curiosity to the European traveler whose mission takes him over any considerable distance in the states. All this work is reducible to a simple question of account keeping, and having a central institution which has the power to fix the distribution of the moneys received, and make its division final.

It is said by some that the Railway Clearing House acts as a clog on the functions of English executive officers as compared with the freedom enjoyed by American officials. But effective supervision or account keeping only means careful and accurate working, and economical results. Far more irksome to the executive element, as we have previously pointed out, is the real, and often very penetrating, though withal courteous, share of control exercised by the boards of directors, and their offshoots the standing committees, of the different railroad companies, especially in matters of supreme policy.

BOARD OF TRADE.

Nor are the executive officers free from the watchful and paternal eye of the British Government, through the operations of the department known as the Board of Trade. A division of that department, known as the Railway Department, which undertakes as one of its especial duties imposed by law the investigation and certification of all questions relating to public safety on railroads, has a most important bearing on executive administration. Before a new railroad can be opened for public traffic inspectors of that department (who are usually trained officers of high rank in the Royal Engineers) must go over the line, stations and works, and certify that they are in all respects safe and complete, and fit for public use. The Board of Trade can and often does withhold its sanction to the opening of the line until every detail requirement, even, perhaps, to the extra ballasting of a few yards of road, the removal of a signal post or the raising or lowering a few inches of a platform by which passengers alight from trains is complied with.

All accidents and collisions on railroads already in working, no matter how trivial, have likewise by law to be scrupulously reported by the companies to the Board of Trade, and in all the more important cases the Board's inspectors are sent to the scene of the accident, where an inquiry is held in the presence of all the company's officials and others. If the accident has been attended by loss of life an immediate inquiry is held (often simultaneously) by a coroner who, with a jury of 12 men, endeavors to ascertain if any one is criminally or otherwise responsible for the cause of death, and according to the finding of the jury he can issue warrants of arrest and committal against the incriminated parties.

All these inquiries are held with open doors, and the evidence freely reported by the press. But the Government (Board of Trade) Inspector's inquiry, being more of a special and technical character, his conclusions are embodied in a report which is printed within a week or so of the inquiry, copies sent to all the railroad companies and other parties concerned, as well as the press, and also presented to Parliament. Praise or blame is as a rule very fairly and impartially distributed by the inspectors, and their recommendations, if relating to local and specific points, carry weight, and are often adopted with promptitude by the companies.

THE RAILWAY COMMISSION.

Another element which comes within the realm of control and administration, and sometimes perplexes and thwarts the smooth course of a general manager's business existence is the Railway Commission. It was established by parliament in the year 1873 for the trial and adjudication of the complaints of aggrieved traders and freighters about exceptional or preferential treatment, insufficient accommodation and other matters about which traders throughout the world at large are always harrying traffic managers. This Railway Commission consists of three members, whose salaries are about three thousand pounds a year each, or twice as much as is paid the members of the Inter-state Commission recently appointed at Washington. When the Commission was first formed, one commissioner, Mr. Price, was the chairman of the Midland Railway Company, which position he resigned on the acceptance of office. He was a man of means, and of scholarly and classical attainments very rarely found in a busy commercial man. The second commissioner was an experienced barrister-at-law, and the third, who became chief of the Commission, was an officer in the treasury department of government. These three and a secretary, who himself was also a barrister-at-law, made up the Commission.

Considering that the normal state of mind of the majority of freighters is one of chronic dissatisfaction with accommodations and freights, and a perpetual craving for more, it follows that the Railway Commission in England, like the several state commissioners and the new federal Inter-state Commissioners in America, are likely to have enough work in

the future to occupy their hands, and will be able to distract the attention of railroad managers from their ordinary legitimate duties as much as the most ardent bureaucrat can desire.

The English Railway Commission does not yet possess to the full extent the same powers which have been conferred by Congress on the Inter-state Commission, but a bill promoted by government at the instance of the Railway and Canal Traders' associations, agricultural chambers, chambers of commerce and other bodies acting influentially on Parliament, is now pending before the House of Commons under the title of the "Railway and Canal Traffic Bill," which proposes to enlarge the powers and establish the permanency of the Railway Commission.

This bill is the outcome of several years agitation and the embodiment to some extent of the conclusions or views of committees of inquiry appointed by the House of Commons in 1881, 1882 and 1883 on "Rates and Fares" and of subsequent discussions in Parliament.

The bill before it passes the House of Commons seems likely to have to undergo amendment in a sense hostile to the companies. The traders and agricultural interests think it is not strong enough for them. In other words, they are raising the issue that no measure will be satisfactory to them which does not put an end to the preferential treatment extended to foreign produce to the detriment of British produce. That is to say, for example, American beef shall not only not be carried from Liverpool to Birmingham or London at a less rate for a longer distance than English beef is carried, but that it shall not be carried the same distance for less money. It is the "long and short haul" controversy which took up so much of the last session of Congress, over again. The agriculturists forget that if the companies charge less for carrying the American meat 220 miles from port to port than English meat is carried at over, say 180 or 150 miles to an inland town, it is because the traffic from port to port would, if the railroads did not secure it, be carried at just the same rates as they were compelled to charge by opposition coastwise steamers.

The railroad companies are called upon to define, revise, tabulate, etc., their maximum rates of tolls and charges, and adopt more of a uniform system of goods and mineral classification. Originally, the acts of Parliament giving powers to construct lines 30, 40 and 50 years ago, fixed rather arbitrarily hard and fast figures per ton per mile for certain groups, or species of merchandise, and this rough and ready but short summary of their maximum powers to charge for work done has been followed more or less ever since. Besides being antiquated, it is inelastic and imperfect, or else railroad companies would not have to be fighting for dear life to establish their right to add to these maximum rates charges for terminal services and accommodation.

The executive staff has all these regulative and controlling forces as well as parliamentary menaces to encounter before it can come face to face with the work which constitutes the daily round of administrative duties. The general manager of a typical good English line continues, however, to show at the end of a year a tolerably good record of safe working and substantial profits. Expeditious collection and delivery of freight, absence of serious accidents to life or merchandise, prompt settlements of claims, smooth, quick traveling and good rolling stock for passengers, low ratio of working expenses to receipts, are, as elsewhere, among the essential points upon which the efficient general manager especially prides himself.

The harassing effects, however, of both public and private bill legislation affecting railroads in Great Britain are to be seen in the large measure which they absorb of a general manager's time. The moneys expended in legal expenses every year in parliamentary conflicts between railroad companies would alone suffice to construct a good many additional miles of line each year, while a whole hierarchy of officials are taken from their duties up to London to give evidence or watch the proceedings of various committees adjudicating upon bills affecting railway interests.

The Commission's Interpretation of the Inter-state Commerce Law.

The following is an abstract of the decision rendered by the Inter-state Commerce Commission, on the petition of the Louisville & Nashville for relief from the operations of the law:

The Commission is satisfied that the statute does not require it to prescribe in every instance the exceptional case and grant its order for relief before the carrier is at liberty in its tariffs to depart from the general rule. The carrier must judge for itself what are the substantially similar circumstances and conditions which preclude the special rate, rebate or drawback which is made unlawful by the second section, since no tribunal is empowered to judge for it until after the carrier has acted, and then only for the purpose of determining whether its action constitutes a violation of law. The carrier judges on peril of consequences; but the special rate, rebate or drawback which it grants is not illegal when it turns out that the circumstances and conditions were not such as to forbid it; and as Congress clearly intended this, it must also, when using the same words in the fourth section have intended that the carrier whose privilege was in the same way limited by them, should in the same way act upon its judgment of the limiting circumstances and conditions.

The Commission will leave railroad companies in fixing their tariffs to act upon their own judgment and at their own risk, subject to accountability before the Commission and the courts in cases where complaint is made by interested parties of violation of the law. For the guidance, however, of railroad companies, the Commission in its decision has considered at great length nearly all the questions raised under the fourth section of the law, and has reached conclusions which are summarized as follows:

First—That the prohibition in the fourth section against a greater charge for a shorter than for a longer distance over the same line, in the same direction, the shorter being included within the longer distance, is limited to cases in which the circumstances and conditions are substantially similar.

Second—That the phrase "under substantially similar circumstances and conditions" in the fourth section; is tised in the same sense as in the second section, and under the qualified form of the prohibition in the fourth section carriers are required to judge in the first instance with regard to the similarity or dissimilarity of the circumstances and conditions that forbid or permit a greater charge for a shorter distance.

Third—That the judgment of carriers in respect to the circumstances and conditions is not final, but is subject to the authority of the commission and of the courts, and in case of complaint for violating the fourth section of the act the burden of proof is on the carrier to justify any departure from the general rule prescribed by the statute.

Fourth—That the provisions of section one, requiring charges to be reasonable and just, and of section two, forbidding unjust discrimination, apply when exceptional charges are made under section four, as they do in other cases.

Fifth—That the existence of actual competition, which is of controlling force in respect to traffic important in amount, may make out the dissimilar circumstances and conditions entitling the carrier to charge less for the longer than for the shorter haul over the same line in the same direction, the shorter being included in the longer in the following cases:

(1.) When the competition is with carriers by water which are not subject to the provisions of the statute.

(2.) When the competition is with foreign or other railroads which are not subject to the provisions of the statute.

(3.) In rare and peculiar cases of competition between railroads which are subject to the statute, when a strict application of the general rule of the statute would be destructive of competition.

Sixth—The Commission further decides that when a greater charge in the aggregate is made for the transportation of passengers or the like kind of property for a shorter than for a longer distance over the same line in the same direction, the shorter being included in the longer distance, it is not sufficient justification therefor that the traffic which is subjected to such greater charge is way or local traffic, and that which is given the more favorable rates is not.

Nor is it sufficient justification for such greater charge that the short-haul traffic is more expensive to the carrier, unless when the circumstances are such as to make it exceptionally expensive or the long-haul traffic exceptionally inexpensive, the difference being extraordinary and susceptible of definite proof.

Nor that the lesser charge on the longer haul has for its motive the encouragement of manufactures or some other branch of industry.

Nor that it is designed to build up business or trade centres.

Nor that the lesser charge on the longer haul is merely a continuation of the favorable rates under which trade centres or industrial establishments have been built up.

The fact that long-haul traffic will only bear certain rates, is no reason for carrying it for less than the cost at the expense of other traffic.

WATER COMPETITION.

The Commission takes up competition with carriers by water, and says instances exist and may be found [this is specially considering the petition of the Louisville & Nashville] where the competition of waterways forces down the railroad rates below what it is possible to make them at non-competitive points and still maintain the roads with success or efficiency. The only question that fairly arises in regard to it is whether the competition is kept within proper bounds. Low rates are a necessity of the situation, and if railroads compete with water transportation either on the ocean or on the navigable rivers they have no choice but to accept such rates. To compel the roads to observe strictly the general rule laid down by the fourth section would necessitate their abandonment of some classes of business in which their competition with water transportation is now of public importance. Railroads must either be allowed to compete with vessel-owners and make low charges for the purpose, or they must leave vessel-owners in possession of the business without the check upon charges which competition would afford. The question here is whether this limitation of competition was intended by the statute; or whether, on the other hand, did Congress intend that the existence of competition might in some cases make out the dissimilar circumstances and conditions which would support a greater charge for a short haul, even though it might be over the same line in the same direction, the shorter being included in the longer distance. The Commission reviews the parliamentary history of the law and concludes that it was the intention of Congress to recognize competition as good reason for exceptional rates.

Every railroad company ought, when it is practicable, to so arrange its tariffs that the burden upon freights shall be proportional on all portions of its line and with a view to revenue sufficient to meet all the items of current expense, including the cost of keeping up the road, buildings and equipments, and of returning a fair profit to owners. But it is obvious that, in some cases, when there is water competition at leading points it may be impossible to make some portion of the traffic pay its equal proportion of the whole cost. If it can then be made to pay anything toward the cost, above what the taking of it would add to the expense, the railroad ought not, in general, to be forced to reject it, since the surplus, under such circumstances, would be profit.

COMPETITION WITH FOREIGN RAILROADS.

The question whether railroad competition with other railroads which are not subject to the control of this law, can present a case of dissimilar circumstances and conditions within the meaning of Section 4 may possibly be one of greater doubt. Competition with Canadian roads may, it is believed, present a case of dissimilar circumstances and conditions. Whenever such roads compete with roads in the United States for a business between one part of our country and another a state of circumstances arises and exists as to such business which justifies American roads in meeting such competition by a corresponding reduction of rates, without regard to the fact that in so doing the rates between the terminals may be reduced below rates to and from intermediate places which are otherwise reasonable and just in themselves. The fact that American roads are left free to meet such competition is of itself an assurance that no extensive war of rates is likely to be engaged in by the Canadian roads, or if engaged in to be long pursued.

COMPETITION WITH OTHER RAILROADS.

The competition with each other of the railroads which are subject to the Federal law can seldom, as we think, make out a case of dissimilar circumstances and conditions within the meaning of the statue, because it must be seldom that it would be reasonable that their competition at points of contact should be pressed to the extent that would create the disparity of rates on their lines which the statue seeks to prevent. Some cases, however, will exist in which, unless the force of strictly railroad competition is allowed to create exceptions under the statute, an existing competition which is supposed to be of public interest must come to an end.

One such case is that of the railroad extending from Pittsburgh parallel to the Pennsylvania Railroad as far as Youngstown and thence to Ashtabula, O., where, through connection with the Lake Shore, it gives to the people of Pittsburgh and Youngstown competition with the Pennsylvania road in their business to and from New York and New England. The application of this road for relief is strenuously opposed by the Pennsylvania road, which insists that competition by this roundabout route is illegitimate and ought not, therefore, in any manner to be aided. Whether this position is sound the Commission may determine hereafter. It is sufficient to say of the case at this time that it is one—and not a solitary instance—in which a strict application of the general rule laid down by the statute must be fatal to competition. If the competition in itself is illegitimate it may be right to permit its destruction. One fact obvious in the statement of this case is that the wrong against which the long and short haul clause of the statute is aimed is not to be found in it. There are other cases in the country of roads now taking part in competitive traffic which the peculiarities of situation will compel them to abandon if the long and short haul clause of the statute is strictly applied. This to some extent might be the case with certain north and south roads, like the road from Cincinnati to Toledo and that from New Albany to Chicago, which have heretofore engaged considerably in east and west bound traffic, which they deliver to or receive from other roads crossing them or at their terminals. In many other cases these roads have been accustomed to make the greater charge for the shorter haul simply because the direction they run compels it; but in doing so they may wrong no one, because the rates are not determined by them, but by the direct east and west lines, and are made with regard to relative distance. Both the roads named now have applications pending for relief from an embarrassment for which they are not themselves responsible; and they aver, with plausibility, at least, that the public interest will suffer if they are shut out from such share in competition as they have hitherto taken. We do not pass upon these cases finally at this time and therefore do not undertake to say of them that they constitute cases in which the competition of roads subject to the Federal law creates the dissimilar circumstances and conditions which make up an exceptional case. But this brief reference to the facts is suggestive of a possibility at least that the exceptional case may exist, and if it does exist a strict enforcement of the general rule might be found quite as injurious to the public interests as to those of the railroads which would thereby be shut out from competition.

LOCAL AND THROUGH TRAFFIC.

The fact that the shorter haul is of local traffic and the longer is not we cannot accept as making out a case of dissimilar circumstances and conditions within the meaning of the statute. The claim to that effect which was advanced in support of one of the applications rests upon a theory that railroads are constructed for the special accommodation of the traffic along their lines respectively, and that consequently that traffic may be relied upon for their support, and may fairly be charged with all the items of cost and maintenance. But this theory has very little foundation in fact. It is not true, as a general rule, that railroads are constructed in exclusive reliance upon local traffic; on the contrary, through traffic is also contemplated and is sometimes expected to yield returns even greater than that which the local traffic is likely to give. And whenever a road is constructed with special regard to local traffic, it is very likely to be the case that the local communities take upon themselves especial burdens in aid of the construction. When they do so they may justly claim that their traffic should be favored if discrimination of any sort is to be admitted. There are cases also in which roads have been constructed with especial regard to long-haul traffic, some of them with the aid of the Government grants, and in such cases the theory lacks all plausibility.

That the cost to the carrier of handling and transporting local traffic is greater than that of traffic carried long distances, is a fact which may with greater reason, when the difference is considerable and clearly shown, be claimed to make out a case of dissimilar circumstances and conditions under the statute. We may well believe, therefore, that the statute, in its provision against the greater charge for the short haul, did not intend that a difference in cost which is practically universal, and could not possibly be arrived at with accuracy, should as a general fact be a governing consideration, to the extent that would support the greater charge for the shorter haul in the cases in which such greater charge was in general prohibited. Where there are circumstances to make the short haul exceptionally expensive to the carrier, or the long haul relatively inexpensive, a difference in rates which reason and fairness will justify may still be made within the limitation of the statute; but to make out the exceptional case in which the general rule of the statute may be disregarded on the ground that the circumstances and conditions are not substantially similar the difference in cost should itself be exceptional and be capable of proof amounting to practical demonstration.

CONCERNING ENCOURAGEMENT OF TRADE CENTRES OR INDUSTRIES.

The unrestricted power to make such rates is liable to infinite abuses and in the earnest and sometimes unreasoning rivalry of railroad companies, it has no doubt often been employed as much to give more volume to business as for any anticipated net revenue, and the wrongs have in such cases far exceeded any possible advantages that could accrue either to the roads themselves or to the public * * * *. As between different localities it is no sound reason for discrimination in favor of one as against another that the purpose is to build up the favored locality as a trade centre, and, if the discrimination has existed and has had its effect, the fact that large establishments have thereby been encouraged is no reason why the injustice should be perpetuated. This statute aims at equality of right and privilege, not less between towns than between individuals, and it will no more sanction preferential rates for the purpose of perpetuating distinctions than of creating them.

CONCLUSION.

Our observation and investigations so far may lead to the conclusion that strict conformity to the general rule is possible in large sections of the country without material injury to either public or private interests, and that in other sections the exceptions can be, and ought to be, made much less numerous than they have been heretofore, and that when exceptions are admitted the charges should be less disproportionate. Very many of the roads, as we are informed, have so arranged their tariffs as to make no exception whatever, and where that has been proved to be reasonably feasible, return to the former custom cannot be tolerated. In any case in which a company fails to bring its tariffs into conformity with the general rule, if parties whose interests are thereby unfavorably affected complain, it must be prepared to justify its action by a showing of circumstances and conditions which render it just and reasonable. In the views above expressed the members of the Commission, after full consideration, are unanimous.

The order for temporary relief which was made in favor of the petitioners will be allowed to remain in force until the day originally limited for its expiration. The other petitions for relief under the fourth section of the law number fifty-five. The temporary orders which have been made in some of these petitions will in like manner be permitted to remain in force until the expiration of the time limited in each.

THE SCRAP HEAP.

Injuries at the Hands of Fellow Servants.

A negro is suing the Athens foundry for damages because he let a piece of iron drop on his own foot.—*Athens (Ga.) Banner.* That negro ought to work for a railroad, and if some smart young lawyer hears of him he will. Not everybody's toes are sufficiently distant from the headquarters of the system to establish a claim that such an accident resulted from the act of a party outside of self; but here is at least a fighting chance of a successful suit. If this colored person can make out that there are two of him, Massachusetts employés will have new hope of wealth in their new law.

California Petroleum and Bitumen.

The *San Francisco Chronicle* calls attention to the increasing production of petroleum in that state. The production in gallons for the last 8 years has been:

1879	586,000	1883	6,000,000
1880	1,763,000	1884	6 000,000
1881	4,194,000	1885	8,760,000
1882	5,403,000	1886	10,950,000

This rate of increase will soon put her second only to Pennsylvania.

In addition to petroleum, California has the only deposit of bitumen so far worked in this country. Until the deposit on the island of Trinidad was developed the bitumen in use was, aside from the small products of springs, derived from rock asphalt, which was extracted by breaking the rock into small pieces and throwing it into boiling water, from the surface of which it was skimmed. The bitumen from Trinidad is much cheaper than that derived from the asphalt rock, as, after paying a small royalty, it can be dug from the lake in any desired quantity; but about half of this bitumen is clay in a very fine state, and it is impossible, commercially, to free the bitumen from the last 15 or 20 per cent. of this clay. The bitumens of Cuba and South America are not so fluid as the Trinidad bitumen, but have not in general so large a proportion of clay in them. The California bitumen is found in beds of sand and is said to be perfectly free from clay. Its use so far has been almost entirely confined to paving some streets in San Francisco, the sand and bitumen being apparently combined in the right proportions for making an elastic and nearly indestructible pavement. There are some deposits of bitumen in the mountains southeast of Salt Lake City, which will probably become valuable as soon as railroads afford transportation, and it is claimed there are some deposits in Alabama.

The Ore Shovelers' Strike.

The New York, Pennsylvania & Ohio ore shovelers will not go to work even for $2 a day, for which they struck. The railroad company did not directly consent to pay the men the price they demanded, but made a contract with Elijah Smith by which he was to do the work with authority to pay the men $2 a day. The men do not like the arrangement, but want direct concessions from the company.

More Train Robbers.

At 1:30 o'clock on the morning of June 18 twelve robbers boarded a train on the Southern Pacific road at a station called Schulenburg, near Houston, Tex. They went through the express and baggage cars with neatness and dispatch, and captured booty amounting to nearly $15,000. The whole country around those parts is up in arms. The robbers are probably down the road a short distance waiting for the next train.

The Hawaiian Railroads.

A cablegram announces the temporary suspension of the efforts to effect a loan to build a railroad in the Hilo district, in the island of Hawaii. It seems that $1,500,000 of English capital had been obtained to construct a railroad through that country, but when the news indicating discontent and the instability of the Hawaiian government was telegraphed, it was deemed wise to withhold the bonds from the market. Samuel G. Wilder, who is now in London to advance the railroad enterprise, was Premier of the Hawaiian Kingdom during the administration that was retired seven years ago.

Fast Time on the Vandalia Line.

A newspaper paragraph states that the fast mail train recently ran from Highland to Collinsville, 18.7 miles, in 16 minutes, which is equal to 70.12 miles per hour. This is creditable to the Vandalia and its men and indicates that they did not waste any time in brake trials or attempts to test the slidometer on this trip; but the claim that it is the fastest 18-mile run on record should be made with caution. In the celebrated fast run on the West Shore, July 9, 1885, 36.3 miles, between Alabama and Genesee Junction, N. Y., are recorded as having been run in 30 minutes (72.6 miles per hour), and the regular passenger train on the Philadelphia & Reading (No. 505), which is allowed only one hour and 52 minutes from Philadelphia to Jersey City, does some lively work every day. A casual memorandum on a regular run of this train some time since showed an average of 78 6 miles per hour for 9 miles, the number of seconds per mile being, respectively, 44, 46, 46, 45, 47, 47, 45, 47, 45, and as the train had neither lost nor made up time and did not arrive any too scon this must be an every day feat.

Railroad in Honduras.

The only railroad now in Honduras is 30 miles, from Puerto Cortez to S. Pedro de Sula. The road was graded 60 miles and surveys carried across the continent. To build this road bonds for $27,000,000 were floated and guaranteed by the government. Only one interest coupon was ever paid. Now, the English syndicate has arranged with the bondholders to take the common stock of a new company to be organized with the franchise of the old one and surrender the bonds. This syndicate made a proposition to Honduras in February last to build the road from Puerto Cortez to the bay of Fouseca and a branch to Tegucigalpa, the capital, providing a land grant be given them of 7½ miles on each side of the road, covenanting to commence work within one year and complete the road within five years. This proposition was accepted by the President and his Ministers and their action was ratified by the National Assembly in March.

An American railroad company has been considering seriously the project of building a line of about 120 miles along the north coast to control the banana trade.

The New York Law on Car Heating.

The New York state act concerning car heating has become a law, the bill introduced by Assemblyman Cole having been signed by Gov. Hill June 20. Its provisions are as follows:

It shall not be lawful for any steam railway doing business in this state after May 1, 1888, to heat its passenger cars on other than mixed trains by any stove or furnace kept inside the car; provided that in cars which have been equipped with apparatus heated by steam, hot water or hot air from the locomotive or from a special car, the present stove may be retained, to be used only when the car is standing still, and provided also that this act shall not apply to railroads less than 50 miles in length, nor to the use of stoves of a pattern and kind to be approved by the Railroad Commissioners for cooking purposes in dining room cars. Any person or corporation guilty of violating any of the provisions of this act shall be liable to a penalty of $1,000, and to the further penalty of $100 for each and every day during which such violation shall continue. Upon the application of any railroad covered by the provisions of this act, the Board of Railroad Commissioners may approve of any proposed safeguard or device to be used under the provisions of this act, and thereafter the railroad using such safeguard or device so approved shall not be liable to any of the penalties attached to this act for a violation thereof in regard to any safeguard or device. The violation of any of the provisions of this act shall be deemed a misdemeanor.

An Electrical Phenomenon for the English.

The threatened suppression of the electric railroad still continues to agitate public opinion at Brighton, England, and a strong feeling undoubtedly exists that the corporation will perpetrate a high-handed act of tyranny if it calls upon Mr. Volk to remove his rails from the sea front. By many it is considered that the alleged dangers arising from the railroad are almost purely imaginary, and are devised by those who for selfish reasons, perhaps, desire to put an end to the cheap and rapid mode of conveyance provided by the electric railroad. A suggestion has been made that Mr. Volk should place a wooden horse's head at the front of his car, so as to obviate the likelihood of animals being frightened by the appearance of a car gliding smoothly along without any visible means of motion.—*Electrical Review.*

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Milwaukee, Lake Shore & Western, 3½ per cent., semi-annual, on preferred stock, payable July 15, to stockholders of record June 21.

Pittsburgh, Fort Wayne & Chicago, 1¾ per cent., quarterly.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

The *American Society of Civil Engineers* holds its annual convention at the Hotel Kaaterskill, Hudson River, N. Y., the first week of July.

The *American Institute of Mining Engineers*, forty-eighth meeting, Salt Lake City, Utah, July 6; forty-ninth meeting, Duluth, Minn., July 26.

Railway Telegraphers' Meeting.

The Grand Division of the Order of Railway Telegraphers held its annual meeting in Chicago last week. About 75 delegates were present. The following officers were elected: Grand Chief Telegrapher, A. D. Thurston, La Porte, Ia.; Assistant Grand Chief Telegrapher, C. J. Coombs, Yates Centre, Kan.; Grand Chief Secretary and Treasurer, S. O. Fox, La Porte, Ia.

PERSONAL.

—Edward Nichols has been elected President of the Brooks Locomotive Works, of Dunkirk, N. Y., and M. L. Hinman Vice-President.

—William Wallace, a veteran railroad engineer, died in Buffalo, N. Y., last week. He was born in Scotland in 1805 and came to America in 1832. Ten years later the first railway into Buffalo was opened, with Mr. Wallace as Superintendent. Seven years later he organized a company to build the Attica & Hornellsville road, and, as Chief Engineer, made all the surveys and located the route adopted. He was engaged as Chief Engineer of the Buffalo and State Line Division of the Lake Shore & Michigan Southern. He originated the project of building a road from Buffalo to the coal fields of Pennsylvania, and in so doing, made connection with the Pennsylvania & Erie and other lines, thus obtaining a through route from Buffalo to Philadelphia, Baltimore and Washington.

ELECTIONS AND APPOINTMENTS.

Adirondack.—C. R. Eastman has been appointed Assistant Superintendent.

Atchison Belt Line.—The directors of this new Kansas company are John J. Ingalls, J. K. Blair, John M. Blair, John M. Price, P. Pomeroy, and W. W. Guthrie.

Chicago & Alton.—S. H. Fulton has been appointed Assistant General Freight Agent, headquarters at Kansas City, Mo. W. J. Bogart has been appointed General Eastern Agent, office at New York.

Chicago, Kansas & Arkansas.—The directors of this new Kansas company are: John Doniphan, Joseph Hansen, James Craig, Moses H. Fuqua and Harry M. Hanson, St. Joseph; John N. Insley, Edward L. Worsick, Oskaloosa; Walter G. Seaver, Winfield; J. C. Strang, Larned, Kan.

Chicago, Rock Island & Pacific.—S. O. Brooks has been appointed General Western Freight Agent, with headquarters at Kansas City, Mo., vice Arthur Gower, resigned.

Chicago, Sante Fe & California.—C. W. Smith has been elected First Vice-President and General Manager. A. A. Robinson has been appointed Second Vice-President and Chief Engineer.

Chicago & Western Indiana.—P. H. Peck has been appointed Master Mechanic in place of R. W. Johnson.

Cincinnati, Hamilton & Dayton.—J. K. Cowen, General Counsel of the Baltimore & Ohio, and J. H. Wade have been elected to succeed L. S. Winston and William Procter as directors.

Dayton, Fort Wayne & Chicago.—At the meeting last week of this company, which is the consolidation of the Dayton & Ironton and the Dayton & Chicago, the following directors were elected: F. B. Loomis, W. C. Boone, Christopher Meyer, George Hoadly and T. C. Doremus, of New York; Thomas M. King, who is the Baltimore & Ohio Second Vice-President; F. H. Short and H. B. Morehead, of Cincinnati; J. E. Gimperling, R. D. Marshal and J. O. Arnold, of Dayton; M. C. Allison, of Xenia, O., and George E. Pomeroy, of Toledo. The directors elected Mr. Loomis President, Mr. Allison, Vice-President, Mr. Boone, Secretary and Treasurer, Mr. Short his assistant, and C. C. Waite, General Manager.

Duluth, Red Wing & Southern.—G. H. Crary has been elected Secretary to succeed Edgar Mills.

Fitchburg.—Augustus Kountze, of New York, has been chosen a director in place of Charles A. Welch, of Boston, resigned.

Havana & Quincy.—The incorporators of this new Illinois company are: W. H. Collins and A. W. Wells, of Quincy; A. K. Lowrey, of Mount Sterling; T. Hamer, of Vermont, Ill.; W. B. Lockworthy, of Quincy; I. N. Pearson, of Macomb, and J. M. Darnell, of Rushville, Ill.

Hope & Shreveport.—The following officers have been elected: J. F. West, President; Ed. Alexander, Vice-President; F. M. Thompson, Secretary, and W. Y. Foster, Treasurer.

Lake Shore & Michigan Southern.—Frank J. Whitney has been appointed Western Passenger Agent in place of W. P. Johnson, resigned, with office in Chicago.

Lehigh Valley.—Bert Hayden has been appointed Assistant General Freight Agent.

Milwaukee, Lake Shore & Western.—C. L. Ryder has been appointed General Agent at Chicago.

Missouri Pacific.—Howard F. Parke has been appointed Division Superintendent in charge of the Kansas City section and the Lexington branch, with office at Sedalia, Mo.

H. C. Logan has been appointed Eastern Freight Agent, and W. E. Hoyt, Eastern Passenger Agent, with office in New York.

Mobile & Navy Cove Harbor.—The following directors were elected last week: Gen. John A. McNulta, of Bloomington, Ill.; Samuel W. Allerton and George R. Dunlap, of Chicago; Hon. W. H. Gasque, of Baldwin County; J. T. Clemons, Henry C. McEwan and Thaddeus McNulty, of Mobile. General McNulta was elected President; H. C. McEwan, Vice-President; J. T. Clemons, Secretary; S. W. Allerton, Treasurer, and T. McNulta, General Manager.

Nebraska, Smoky Valley & Southern.—The directors of this new Kansas company are: C. T. Venson, N. J. Thorstenberg, E. E. Manson, E. D. Bradley, K. M. Knox, O. J. Thorstenberg, J. H. Johnson, J. A. Larsen, John Hollinquest.

Newport News & Mississippi Valley.—C. T. Dabney has been appointed Superintendent of the Newport News Division, vice J. W. Hopkins, resigned.

New York, New Haven & Hartford.—E. E. Pratt has been appointed Inspector of Stations and Buildings.

Oakland & San Joaquin.—The directors of this new California company are: John Hewston, Jr., Robert Simson and Richard W. Reading, of Alameda, Cal., and Louis A. Garnett, of San Francisco.

Ogdensburgh & Lake Champlain.—At the annual meeting the following directors were elected: W. J. Averill, of Ogdensburg, N. Y.; J. R. Langdon, of Montpelier; S. A. Kellogg, of Pittsburgh; D. W. Lawrence, of Malone, N. Y.; W. A. Haskell, S. A. Carleton, Henry L. Millis and Stern Morse, of Boston; J. Gregory Smith, E. Curtis Smith, J. W. Hobart and J. S. Stranahan, of St. Albans; B. B. Smalley, of Burlington, Vt.

Oregon & Transcontinental.—The following directors have been elected: Elijah Smith, Christopher Meyer, Sidney Dillon, Fred. L. Ames, C. L. Colby, J. J. Higginson, W. L. Bull, J. N. Hutcheson, W. S. Ladd, Henry Farling, C. N. Lewis, C. A. Dolph, Joseph Simon, C. J. Smith, J. M. Fox, Lloyd Brooke and Jonathan Bourne, Jr.

Ohio Valley.—P. G. Kelsey, of Henderson, Ky., has been elected President; Jordan Giles, of Louisville, Secretary. The directors are S. S. Brown, of Pittsburgh; P. G. Kelsey and H. S. Lambert, of Henderson; Arthur Carey and Jordan Giles, Louisville.

Oregon Railway & Navigation Co.—The old board of directors was re-elected this week except that John Dennison, of Boston, was chosen in place of William Endicott, Jr., and William M. Ladd, of Portland, Oregon, in place of C. H. Lewis.

Pittsburg, Baxter Springs & Galveston.—The directors of this new Kansas company are Charles W. Daniels, John M. Cooper, George G. Gregg, Richard A. Lovel and Howard R. Crowell.

Portland & Willamette Valley.—The following directors have been elected: Chas. F. Crocker, Timothy Hopkins and M. N. Huntington, of San Francisco; William Reid, T. S. Brandogee and Col. John McCracken. The directors elected the following officers: Col. Chas. F. Crocker, President; William Reid, First Vice-President; Timothy Hopkins, Second Vice-President.

St. Louis, Alton & Springfield.—The officers and directors of this new company are: President, Delos R. Haynes; General Manager, H. A. Fisher; Secretary, L. C. Harris, of St. Louis; W. H. Hartman, Springfield, Ill.; General Freight and Passenger Agent, W. R. Church, Springfield, Ill. Directors, D. R. Haynes, H. A. Fisher, W. H. Hartman, F. E. Fisher, W. R. Church.

St. Paul & Duluth.—J. A. Gwynne, G. F. Baker and William Dawson have been elected to succeed J. J. Hill, H. E. Upham and Charles Fairchild as directors.

Syracuse, Ontario & New York.—George H. Graves has been appointed Superintendent in place of Albert Allen, resigned. Mr. Graves will also act as General Freight and Passenger Agent, and Purchasing Agent.

Texas & Pacific.—Z. A. Mills is appointed Pacific Coast Freight Agent, vice H. C. Logan, transferred.

W. Bradburn has been appointed Resident Engineer, headquarters at Marshall, Tex.

Terre Haute & Indianapolis.—Joseph Hill, General Superintendent, is appointed Assistant General Manager, with office at Terre Haute, Ind. Charles Neilson, now Superintendent of the Cincinnati, Hamilton & Dayton, is appointed General Superintendent, with office at St. Louis.

OLD AND NEW ROADS.

Atchison Belt Line.—Incorporated in Topeka, Kan. The company will build 10 miles of road and has a capital of $250,000.

Atlanta & Hawkinsville.—This road is now being rapidly built. The main line in Southern Georgia will pass through Dooley, Worth and Colquitt counties, by way of the towns of Isabella and Toulain, and thence through Thomas County and into the state of Florida.

Baltimore & Ohio.—The company has bought 30 acres of land at Northfield, Staten Island, near the site of the proposed Arthur Kill bridge.

Big Sandy, Tug River & Twelve Pole.—Incorporated in West Virginia. The purpose is to build a road from Ceredo, Wayne County, in West Virginia to the Kentucky line, together with various branches. Capital stock, $500,000. The stock is held by parties in Ashland, Ky.

Birmingham, Atlantic & Air Line.—It is stated that the building of this road is now assured. Work has

commenced at Savannah, Ga., and will continue until the entire line is completed to Birmingham. The contract for building from Savannah to Macon, Ga., has been let and this part of the road is to be completed by Jan. 1.

Boston & Maine.—The principal provisions of the lease of the Boston & Lowell road to this company are as follows: The Boston & Lowell leases its entire road and property, all rights and franchises in and out of the state, with its title and interest in all roads operated by it under lease or otherwise, so far as the same are transferable in law, and all dividends and right of voting on stock of roads owned by the Boston & Lowell, and all bonds, contracts, etc., of or with other roads, the Boston & Maine to hold the same for 99 years from April 4, 1887. The Boston & Maine shall pay every manner of expenses of the Boston & Lowell and its leased lines, and shall pay $1,750 to the Boston & Lowell every three months. Also on July 1, 1887, it shall pay the Boston & Lowell $193,523, that being 3½ per cent. on Boston & Lowell capital stock. The same sum shall be paid on Jan. 1 and July 1 until Jan. 1, 1897. And thereafter $221,176 shall be paid on the same dates. Under direction of the Boston & Maine the Boston & Lowell will continue to operate such roads as cannot be at once transferred, and will also continue the construction of the Central Massachusetts road. It shall acquire the Mystic River Co., Ocean Terminal Railroad Co., Ocean Terminal Dock and Elevator Co., if so authorized, and issue bonds and stocks therefor under direction of the Boston & Maine. The Boston & Lowell shall issue without delay its stock or bonds for funding all floating indebtedness, including notes given the Nashua & Lowell, if the same can be so funded, but not its current debts or open accounts. Leases and contracts of the Boston & Lowell, when expiring, shall be renewed under direction of the Boston & Maine under most favorable terms, but the Boston & Maine shall not be bound to assent to such renewal at higher than existing rental, unless the Railroad Commissioners shall decide such renewal to be necessary to the reasonable protection of the interest of the Boston & Lowell. The Boston & Lowell shall make such other leases or contracts with other railroads as the Boston & Maine shall request, such obligations to be assumed exclusively by the Boston & Maine. The Boston & Maine shall have right of voting on all stock owned by the Boston & Lowell in other roads, save as hereinafter provided, and said stock shall not be disposed of by the Boston & Lowell, except with assent of the Boston & Maine. If the Boston & Maine fail to make paymeuts for interest, or shall fail for 30 days to make the semi-annual dividend payments, or shall fail to perform any other covenants, the lease terminates. In cases of disagreement as to the meaning of the lease or anything done by virtue of it, the matter in controversy shall be referred in writing to arbitrators.

Messrs. Frank Jones, Charles A. Sinclair and George Vandyke have signed a bond in the sum of $75,000, agreeing to build and equip the Upper Coos railroad from North Stratford on the Grand Trunk to the Canada line at Canaan, Vt., a distance of 23 miles, provided the citizens along the line will subscribe $25,000. The road will be standard gauge, and will be the property of the three gentlemen named above, who will build in the interest of the Boston & Maine.

The Coos charter gives the right to build by the side of the Grand Trunk from Groveton to North Stratford if deemed expedient. The towns through which the line will pass after leaving North Stratford are Columbia, Bloomfield, Colebrook, Stewartstown and Canaan.

Buffalo, New York & Philadelphia.—The sale of this road, under the $7,000,000 consolidated bond, the $28,000 collateral bonds and the $7,000,000 first mortgage bonds will be held at Pittsburgh, Pa., on Sept. 15.

Buffalo, Rochester & Pittsburgh.—A motion for an injunction to restrain the directors from issuing bonds to the amount of $1,000,000 and from issuing certificates of indebtedness to the amount of $3,000,000 to the holders of $6,000,000 worth of preferred stock was argued in Pittsburgh last week. The Judge refused to make any order concerning the $1,000,000 of bonds, but ordered the directors not to issue the $3,000,000 worth of certificates until further order of Court.

Camden, Rockport & Rockland.—The preliminary survey for this proposed road has reached Rockland, Me. O. H. Tripp, C. E., is in charge of the survey.

Canadian Pacific.—It is said that the prospects of the Niagara Central Railroad have been spoiled by the incorporation of the South Ontario Pacific. The Canadian Pacific will control this latter road, which was projected under the name of the Guelph, Hamilton & Buffalo, and will form a link between the Niagara and Detroit rivers. Less than a year ago the Canadian Pacific had offered the Niagara Central people to operate the road when completed, and pay them 35 per cent. of the gross earnings, and with this understanding the Niagara Central has been under construction. The charter to the new road adds an opposition line, and renders impossible a profitable operation of the Niagara Central. It is thought that the Canadian Pacific will reimburse the projectors for their expenditure on the road, but will not assume responsibility for any of the company's liabilities.

The House of Commons in Canada has passed a resolution granting land subsidies of 640 acres per mile to 650 miles of railroad in the Northwest Territories. The lines are all feeders of the Canadian Pacific.

The Abyssinia, the first steamship on the new trans-Pacific service between China, Japan and America, arrived at Vancouver from Yokahama on June 13, making the run in 14 days.

Central Missouri.—The company has filed a mortgage in Madison County, Ill., setting forth the intention of the incorporators to build a bridge and railroad within the limits of that county. The mortgage is for $8,000,000.

Centre & Sabine River.—The line is surveyed from Logansport, La., to Centre, Tex., 16 miles, and the company intends building at once.

Chicago, Kansas & Arkansas.—Incorporated in Kansas. The company proposes to build a road from St. Joseph, Mo., to Little Rock, Ark., via Topeka. The road is to pass through Doniphan, Atchison, Jefferson, Shawnee, Douglass, Franklin, Miami, Anderson, Linn, Allen, Bourbon, Rooks, Crawford, Labette and Cherokee counties. A branch road will leave the main line in Jefferson or Douglas county, extending through Shawnee, Osage, Lyon, Morris, Chase, Marion, McPherson, Rice, Harvey, Reno, Sedgewick, Kingman, Stafford, Pratt, Pawnee, Edwards, Hodgeman, Ford, Finney, Hamilton, Stevens and Norton. Another branch will leave the last named line at the same point in Lyon and extend to the south line of the state through Lyon, Chase, Butler, Cowley and Summer counties. The estimated length of lines is 1,360 miles.

Chicago, Milwaukee & St. Paul.—The route on which this company will build its extension to the Gogebic iron country and Ashland, Wis., will begin at Berlin, Wis., running to Stevens' Point, through Waushara and Portage counties. This extension will strike the Merrill branch a little north of Stevens' Point. The extension of the Tomahawk branch, now being built to Hurley, and on to Ashland, will make what is claimed to be the shortest line from either Chicago or Milwaukee to Ashland and the iron regions.

Chicago & Northwestern.—The company has graded about 50 miles beyond Douglass, on its Wyoming Central line, and will lay the track this summer.

Chicago, Rock Island & Pacific.—The contract for erecting the freight depot at Wichita, Kan., has been given to Bolton & Berger. The building will by 175 × 40 ft., and is to be completed by July 10.

Tracklaying on the Wichita line of this road is completed across the main line of the Atchison, Topeka & Santa Fe at Peabody, Kan. The line to McPherson and the Southwest is finished to the county line between Marion and McPherson counties. Grading is in progress on Abilene & Salina branch and the Manhattan & Clay Centre branch.

Columbus, Hocking Valley & Toledo.—R. A. Harrison, counsel for Stephenson Burke, has been given until July 1 to file his brief in the motion argued at length by Burke, ex-Governor Hoadley and others a month ago. This will postpone any decision in all likelihood until the September term of court.

The Brush Fork branch has been opened from a junction on the Snow Fork branch to Brashears, O., 2 miles.

Consolidated Transit Co.—The Committee on Railroad in the Philadelphia City Council agreed last week to report favorably the bill granting this company the right to build elevated roads on various streets of the city.

Crete, Milford & Western.—The Chicago, Burlington & Quincy has filed articles of incorporation in this name for a road through Saline, Seward, York and Hamilton counties, in Nebraska, to a point on the Hastings & Aurora cut-off. Work began on June 13.

Dayton, Fort Wayne & Chicago.—The stockholders elected this week a board of directors and officers which represents the interests of the Ives-Staynor people and the Baltimore & Ohio road. It is said that the latter thus obtains through connection to St. Louis, over the Dayton, Fort Wayne & Chicago and the Cincinnati, Hamilton & Dayton to Indianapolis, where the St. Louis, Vandalia & Terre Haute will take the St. Louis traffic. The Baltimore & Ohio express is to be extended over the Vandalia and will be withdrawn from the Ohio & Mississippi.

Articles of consolidation of the Dayton & Ironton and Dayton & Chicago railroad companies under the above name have been filed in Ohio. Capital of the consolidated company is $15,000,000.

Denver & Rio Grande.—With new mileage and change of gauge on the old line, preparations for which have been completed, this company will have 523 miles of standard gauge road. There have been 21,000 tons of steel rails bought, also 27 locomotives and a proportionate amount of freight and passenger cars, etc. The outlay involved will be some $6,000,000, which is already provided, and the only increase of debt is the $20,000 per mile of consolidated mortgage 4 per cent. bonds on the 160 miles of new road. These bonds have already been sold to a German syndicate.

Equitable Transportation Co.—The company has obtained a charter to build an elevated road from Blue Island to Chicago. Capital stock, $1,000,000.

Georgia, Carolina & Northern.—The contract is let for 50 miles between Monroe and Chester, Ga., and the line from Atlanta to Athens will be contracted for within two months.

Grand Trunk.—The company has secured a charter to build a road 15 miles long from Owen Sound to Stratford, Ont., to connect with its Buffalo & Lake Huron line.

Havana & Quincy.—Articles of incorporation filed in Illinois. It is proposed to construct the road from Havana to Quincy. Capital stock, $1,000,000. Office at Quincy, Ill.

Illinois Central.—At a meeting last week the stockholders decided to increase the capital stock of the company as recommended by the directors. The proposition in detail was contained in the *Railroad Gazette* of May 27.

Inter-state Consolidated Rapid Transit.—This is a consolidation of the Inter-state Rapid Transit, the Kansas City & Wyandotte, the Riverview and the Brighton Hill & Chelsea Park railroad companies. Capital, $1,400,000. Office, Kansas City, Mo.

Louisville, Cincinnati & Dayton.—The road is completed from Hamilton, O., north to Middletown, 13 miles.

Mexican Railroads.—President Wade, of the Mexican Central, who has been in Mexico, hopes to have the Guadalajara branch completed by March of next year, and the Tampico branch in the course of two years. The International, Huntington, line is expected to reach Villa Lerdo this fall, which will give the Central connection with cheaper fuel for its locomotives, and for smelting and other purposes on its line.

Nebraska, Smoky Valley & Southern.—Chartered in Kansas. The company propose to build a standard gauge road from Concordia, in Cloud County, to the city of Burrton, in Harvey County, running through the counties of Cloud, Ottawa, Saline, McPherson and Harvey. Estimated length of road, 75 miles. Capital, $500,000.

New Hampshire.—A bill incorporating this company has been introduced in the New Hampshire Legislature. It provides for a union of all the state railroads, makes the capital stock $10,000,000, limits the dividends to 7 per cent., and the passenger tariff to 2½ cents per mile.

New York, Chicago & St. Louis.—The company has filed articles of incorporation in New York state, and the line in the state is from Buffalo to the Pennsylvania boundary, 70 miles. Capital, $4,500,000.

Northeastern of Georgia.—A petition has been made in the interest of the minority stockholders of this company to enjoin the Richmond & Danville from putting a bonded debt of $315,000 on the road. The Richmond & Danville owns a majority of the stock.

Northern Pacific.—A syndicate composed of officials of this company has bought the Hotel St. Louis at Lake Minnetonka, Minn., and an arrangement has been concluded with the Chicago, Milwaukee & St. Paul to build a branch road from Hopkins Station on the line to the hotel, a distance of 9 miles. The contract has been let to R. B. Langdon and the line will be completed in 30 days.

Oakland & San Joaquin.—Articles of incorporation filed in California. The proposed road will extend from Oakland to Antioch, Contra Costa County, via Lion Creek Ravine, through Redwood Cañon, Moraga and Ignatia valleys, and by the foothills of Mount Diablo, a total distance of 35 miles. Capital stock, $1,000,000.

Old Colony.—The stockholders of the Hanover Branch have voted to dispose of the road to the Old Colony Company for $123,995, which is the price of the stock at its par value. The road extends from North Abington to South Hanover, Mass., 8 miles. The Old Colony takes possession on July 1.

Pacific.—The United States Commissioners took the testimony of Marvin Hughitt, President of the Chicago & Northwestern, in Chicago last week. They then met in Omaha, Neb., on June 20, and proceeded with their examinations.

On June 22, Thomas L. Kimball, General Traffic Manager of the Union Pacific, was examined as to rebates. He stated that his company had been compelled to give rebates because its competitors did so, and acknowledged that it had the effect of embarassing the small shippers. Still, it had to be done in order to hold the large business. The commissioners required Mr. Kimball to furnish statistics showing the business done by the Union Pacific for the Standard Oil Co. and its associated companies, and other oil shippers over the road.

Philadelphia & Reading.—The reconstruction trustees have arranged to advance the Receivers of this company between $5,000,000 and $6,000,000, with which to pay off the floating debt of the company by Aug. 5, and there will be no interest charged upon the same. The company now has only $15,000 of its $3,000,000 of Receivers' certificates outstanding, and it will at the earliest date possible take care of $2,000,000 of overdue coupons, beside having paid Drexel & Co. $100,000 advanced by them on coupons of the consolidated mortgage. It is now stated as possible that the property will be taken out of the hands of the Receivers by Oct. 1, instead of November, as has been before stated.

Master Dallas has filed his report in the matter of the petition of the conductors for extra pay accrued prior to Dec. 1, 1883, amounting to $69,083. Mr. Dallas recommends that the Court dismiss the petition. The present claims are not liens, and in the master's judgment the Court will not give them the effect of liens.

Richard Dale, of New York, on behalf of William Robinson, the complainant in the suit for foreclosure against this company, presented this week before Masters Dallas and Pollock, a form of order of sale, which he asked should be reported to the court. It directs, in substance, that the trustee under the mortgage shall sell the Philadelphia & Reading Railroad, its main line and branches, and leasehold estate in adjunct railroads as an entirety, and that he shall sell separately the leasehold estate in the Schuylkill Navigation and Susquehanna Canal companies.

At a meeting of the Trustees this week, held in relation to the settlement with the security holders of the Schuylkill Navigation Co., it is stated that a settlement was practically agreed upon, based on a fixed charge of $379,000.

Pittsburgh, Baxter Springs & Galveston.—This company has obtained a charter in Kansas. The purpose is to build a railroad and telegraph line from a point in Crawford County, near Pittsburgh, through Cherokee County to the south line of the state of Kansas, at or near the city of Baxter Springs. Capital stock, $250,000. General offices at Baxter Springs.

Pittsburgh & Lake Erie.—Judge Stowe has overruled the demurrer in the suit of Cornelius Vanderbilt against the trustees of this company to break the trust deed and enjoin the defendants from interfering with Vanderbilt in the voting of his stock. The plaintiff was required to strike from the bill the prayer declaring null and void the trust deed. The Court requires the defendants to answer the bill as it now stands within 20 days from June 18.

Pittsburgh, Youngstown & Ashtabula.—This is the new name of the Ashtabula & Pittsburgh road.

Port Jervis, Monticello & New York.—It is stated that the management of this recently organized company will build a line to connect the Pennsylvania Railroad system with the New England roads centering at the Poughkeepsie Bridge. At a recent meeting of the directors action was taken to secure the immediate construction of that portion of the road between Port Jervis, N. Y., and "The Traps," near Kerhonkson, Ulster County, a distance of 30 miles. It was reported that the final surveys are nearly completed, all of the heavy work under contract. The plans contemplate the construction of a new section of road from Huguenot on the old Port Jervis & Monticello road to the new bridge, a distance of 40 miles, with a branch from "The Traps" to Kingston, 20 miles. The Belvidere Division of the Pennsylvania extends from Philadelphia to a point near the Delaware Water Gap, 102 miles, and by building 40 miles further could connect with the Port Jervis road at Port Jervis.

Red River Valley.—It is stated that a contract has been let to build the Red River Valley Railway from Winnipeg to the boundary, in opposition to the Canada Pacific, for $780,000.

Riverside, Los Angeles & Santa Ana.—At last reports the track on this branch of the Atchison system was laid to Point Rincon, Cal., 15 miles from Santa Barbara.

Rulo, Hiawatha & Southwestern.—At a meeting of Rulo and Hiawatha, Kan., citizens last week it was decided to proceed with the building of a road from Rulo to Hiawatha, thence southwest to Warnego. A committee was appointed to procure a charter for a company under the above name.

St. Louis & Chicago.—The company has signed a contract with John M. Rutherford, of New York, to build 40 miles of road from Springfield to Emden in Logan County, Ill., to be finished by Oct. 1, and 35 miles more from Emden to Eureka, Woodford County, to be ready for the rolling stock on Jan 1. The line will connect at Eureka with the Santa Fé, completing a new through line between Chicago & St. Louis.

St. Louis, Keokuk & Northwestern.—Daniel P. Ellis, of Cleveland, has filed a foreclosure suit at Keokuk, Ia., against the railroad. In 1875, complainant's bill states, the railroad company issued a series of interest bearing bonds aggregating $2,700,000, payable Jan. 1, 1906, secured by a mortgage. A floating debt of $900,000 is alleged to have been incurred, and the complainant asks that the mortgage may be decreed a first lien, that a receiver be appointed and the property sold.

St. Paul, Minneapolis & Manitoba.—The Great Falls extension was completed last week 13 miles west of Fort Buford, Dak., about 88 miles since the middle of last month. Heavy rains have been falling during the last ten days, and the Missouri River is swollen beyond its banks. The movements of the tracklayers have been impeded by the rain and mud, but they have made quick progress notwithstanding.

San Francisco & North Pacific.—Contracts have been let for building 7 miles of road from the main line of this road at Pacheco, Cal., and running in a northeasterly direction to connect with the branch to Glen Ellen, at Sears Point. There will be a 3000-ft. trestle, and an iron draw bridge to build over Petaluma creek, having two spans, each 100 ft. in length.

Santa Rosa, Sebastapol & Green Valley.—The survey of this road is completed and the right of way has been deeded on the entire promised route. The company was in-

corporated early in April. The road is to extend from Santa Rosa, Cal., westward to Sebastapol, thence to a connection with the San Francisco & North Pacific, 15 miles.

Shenandoah Valley.—The committeee of the first mortgage bondholders of this company has advised the acceptance of the following propositions made by the Norfolk Western:

First. The road to be sold under foreclosure and reorganized.

Second. A new first mortgage is to be issued securing $5,100,000, payable in 50 years, with interest at 5 per cent., payable semi-annually. Preferred stock to the amount of $8,000,000 is also to be issued. The Norfolk and Western is to operate the road for 99? years and pay over not less than 30 per cent. of the gross earnings, to be increased in the ratio of increased business, but never to be less than the interest on the funded debt. It is to be provided in the new mortgage that $510,000 more of bonds may be issued when necessary for new equipment. Out of the proceeds of the mortgage loan all liens prior to the first mortgage shall be paid.

Third.—Holders of first-mortgage bonds are offered in cash the accrued interest to July 1, 1887, or 17½ per cent., less .2 per cent. for expenses, and a new $1,000 bond for each old one. Holders of general-mortgage bonds are to receive 25 per cent. in the new bonds and 100 per cent. in preferred stock.

South Ontario Pacific.—An act has been passed incorporating this company in Ontario. The road will be operated by the Canadian Pacific, forming a link for that road between the Niagara and Detroit rivers.

Texarkana & Northern.—The City of Texarkana, Ark., has given bonds to insure the payment of its subscriptions of this road, and it is stated that work is to begin at once. The company was organized a year ago, and ten miles of the road have just been completed. The ultimate design was to go to Fort Smith, but the necessary funds for accomplishing this result were not forthcoming. President Hinckley, of the St. Louis, Kansas & Colorado, offered to the City of Texarkana to build the road if the city would donate the ten completed miles and $50,000. This has been done. The surveys are already made.

Texas & Pacific.—Judge Pardee of New Orleans has issued two decrees ordering the sale of this road unless the debts involved are paid by June 30, to satisfy the claim on a deed of trust dated June 1, 1875, of Mathew Baird and George D. Krumbhaar, of $9,316,000 and $289,480 interest defaulted on June 1, 1886, and the claim of the Fidelity Insurance Trust and Safe Deposit Co. for $756,000 in a mortgage deed of trust Jan. 20, 1880, and $11,725 interest defaulted Feb. 1, 1886.

Toledo, Cincinnati & Southern.—The road has been ordered sold by the District Court at Toledo, O. The sum of $600,000 is fixed as the minimum price, $100,000 to be paid in at the time of the sale. The road extends from Toledo to Findlay, O.

Wabash Railway.—The arguments on the petition of the purchasing committee and the bondholders of the Chicago Division of this road, to turn over that division to the purchasing committee on the payment of all arrears of interest were resumed in Chicago last week. Justice Harlan listened to arguments on June 18, and when he came into court on June 20 he said to the attorneys that he had reached the conclusion that the case ought to be withdrawn from court, where it had no place. Without expressing any opinion on the merits of the case he advised the lawyers to come to some understanding in the matter. The continuance of the case in court could and should be avoided. The lawyers went away to think the matter over.

Wabash Western.—The company is to build offices in Kansas City, Mo., and Superintendent H. L. Magee will remove to them from Moberly, Mo.

Wagner Sleeping Car Co.—The company has just entered into a 15-year contract with the Duluth, South Shore & Atlantic, and has established a drawing room and sleeping car line between St. Ignace and Houghton, Mich.

West Jersey.—The sale of the Anglesea road to this company was concluded this week. The consideration was $28,000. The road extends from Anglesea Junction, N J., to Anglesea, Wildwood and Holly Beach, 7 miles.

Wisconsin Central.—The company has filed articles of incorporation in Wisconsin consolidating under the management of one company all the roads and branches of its system heretofore existing under several names. They aggregate 680 miles of road. Capital stock is $15,000,000, of which $8,000,000 is preferred stock.

TRAFFIC AND EARNINGS.

East-bound Shipments.

The shipments last week of all freights except live stock from Chicago eastward to seaboard points amounted to 29,596 tons, a decrease of 125 tons from the week previous. The percentages of the different roads were as follows: Baltimore & Ohio, 9.9; Chicago & Grand Trunk, 15; Chicago, St. Louis & Pittsburgh, 8.8; Lake Shore & Michigan Southern, 17.5; Michigan Central, 19 2; New York, Chicago & St. Louis, 8; Pittsburgh, Fort Wayne & Chicago, 19.3; Cincinnati, Indianapolis, St. Louis & Chicago, 2.3.

Cotton.

The cotton movement for the week ending June 17 is reported as below, in bales:

	1887.	1886.	Inc. or Dec.	P. c
Interior markets:				
Receipts	2,421	12,325	D. 9,904	80.3
Shipments	7,987	27,392	D. 19,405	70.8
Stock	46,093	105,274	D. 59,181	56.2
Seaports:				
Receipts	3,549	24,884	D. 21,332	85 7
Exports	8,528	37,028	D. 23,500	73 3
Stock	315,016	425,218	D. 110,202	25.9

Total movement from plantations for the crop year ending June 17 was 6,309,293 bales, against 6,419,305 last year, 5,583,943 in 1884-85, and 5,616,258 in 1883-84.

Coal.

Coal movement for the week ending June 18 is reported as follows:

	1887.	1886.	Inc. or Dec.	P.c.
Anthracite	633,866	658,622	D. 4,756	0 7
Bituminous	300,007	231,690	I. 68,317	29.4
Coke (June 11)	11.386	74,355	D. 62,969	84.6

Cumberland coal shipments for the week ending June 18 were 61,396 tons, and for the year to that date, 1,437,363 tons, an increase of 775,026 tons, as compared with corresponding period last year.

The coal tonnage of the Pennsylvania road for the week ending June 11 is reported as below:

	Coal.	Coke.	Total.	1886.
Line of road	216,236	11,386	227,622	221,921
Year to date	4,625,946	1,564,380	6,190,326	4,959,367

Increase for the week 5,701 tons, or 2.5 per cent.; increase for the year 1,230,959 tons, or 24.8 per cent.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

	1887.	1886.	Inc. or Dec.	P. c.
Five months—Jan. 1 to May 31:				
Atch., T & S. Fe.	$7,532,507	$5,688,614	I. $1,843,893	32.4
Atlantic & Pac.	1,092,757	535,605	I. 557,152	104.0
Buff., N. Y. & P.	1,029 878	974,077	I. 55,801	5.7
Buff., R. & Pitts.	757,850	5?9,131	I. 228,728	43 2
*Bur., C. R & No.	1,089,465	975,048	I. 114,417	11.7
Cairo, V. & C.	284,904	225,731	I. 59,233	26 2
California South.	633,417	249,005	I. 384,412	154.0
Canadian Pac.	3,646,793	3,264,419	I. 382,374	12.0
Cape F. & Y. Vy.	105,056	9 ,152	I. 14,904	16 5
Ches. & Ohio	1,670 845	1,497,619	I. 173,826	11.6
Eliz., L. & B. S.	385,417	326,064	I. 59,353	18.2
Ches., O. & S. W.	684,580	607,661	I. 76,719	12.6
Chic. & Atlantic	839,158	582,919	I. 256 239	43.9
Chi. & East. Ill.	772,212	658,738	I. 113,474	17.2
Chi., Mil. & St. P.	9,074,000	8,573,654	I. 500.346	5.8
C., St. L. & P.	2,108,544	1,786,657	I. 381,887	21.9
Chic. & W. Mich.	542,617	524,303	I. 18,314	3.4
Cin., H & Day	1,266,570	1,081,291	I. 185,279	17.2
C., I., St. L. & C.	1,059,119	1,008,901	I. 50,218	4.9
Cin., N. O. & T. P.	1,298,577	1,049,027	I. 249,550	23.8
Ala. Gt. South.	597,252	456,529	I. 140,723	30.8
N. Orl. & N. E.	271,134	260,458	I. 10,676	4.0
Vicks. & Mer.	209,524	205,729	I. 3,795	1.3
V., Shre. & P.	266,267	170,394	I. 35,873	20.4
Cin., R. & Ft. W.	158,526	141.438	I. 17,088	12.0
Cin., W. & Balt.	827,795	764,016	I. 63,779	8.3
Cleve., Ak. & C.	215,406	201,691	I. 13,715	6.7
Cleve. & Canton	142,362	127,759	I. 14,603	11.4
Cl., C., C. & I.	1,040,850	1,469,934	I. 170,922	11.6
Col. & Cin. Mid.	122,468	106,260	I. 16.238	15 3
Col., H. Vy. & Tol.	1,046,463	817,380	I. 229,083	28.0
Den. & R. G.	2,886,132	2,324,556	I. 561,576	24.1
Det., B. C & Al.	169,511	70,744	I. 98,767	139.6
Det., Lan. & No.	444,194	460,966	D. 16,772	3 6
*E. Ten., Va. & G.	1,844,330	1,490,026	I. 354,304	23.7
Ev. & Ind'apolis.	90,590	54,497	I. 36,093	66.1
Ev & Terre H.	322,387	263,427	I. 58,960	22.3
Flint & Pere Ma.	1,038,648	905,451	I. 133,197	14.7
Fla. Ry. & N.	452,382	401,640	I. 50,742	12.6
Ft. W. & Den. C.	248,553	140,231	I. 108,322	77.2
Georgia Pacific	434,454	298,936	I. 135,518	45.5
Grand Rap. & I.	870,942	726,140	I. 144,812	19.9
Grand Tr. of Can.	6,680,077	6,130,197	I 549,880	8.9
Houston & T. C.	917,690	926,186	D. 8,496	.9
Illinois Central:				
South Div.	4,403,425	3,930,257	I. 473,168	12.0
Iowa Div.	816,069	630,484	D. 14,415	2.2
Ind., Bloom. & W.	1,001,077	934,065	I. 67,012	7.1
Ind., Dec. & Spr.	162,475	149,532	I. 12,943	8 6
*K. C., Ft. S. & G.	1,021,547	920,748	I. 100,799	10.9
*K. C., Spr. & M.	761,337	533,302	I. 228,035	42.7
*K. C., Clint. & S.	98,583	81,639	I. 16,944	20.7
Lake Erie & W.	734,919	607,904	I. 127,015	20.5
Lehigh & H. R.	98 847	86,712	I. 12,135	13.9
Long Island	1,005,144	926,966	I. 78,178	8.4
Lou., Ev. & St. L.	379,688	313,088	I. 66,600	21.3
Louisv. & Nashv.	6,134,011	5,210,521	I. 923,490	17.7
Lou., Alt. & C.	830,585	640,804	I. 189,781	29.6
Lou., N. O. & T.	805,004	629,798	I. 175,206	27.8
Manhattan Elev.	3,372,647	3,078,535	I. 294,112	9.5
Marq., H. & O.	250,300	240,589	I. 9,711	4 0
*Mem. & Charles.	611,643	495,253	I. 116,390	23.5
†Mexican Central.	1,907,565	1,508,502	I. 399.063	25.4
†Mexican National:				
South. Div.	474,978	417,784	I. 57,194	13.6
Mil., L. S. & W.	1,077,564	706,637	I. 370,927	52.4
Mil. & North	369,886	244,037	I. 125,849	51.5
Minn. & N. W.	388,304	134 791	I. 253.513	188.0
Miss. & Tenn.	175,813	157,442	I. 18,370	11.6
Mobile & Ohio	953,474	826,421	I. 127,053	15.3
N. Y. C. & H. R.	13,878,111	12,248,367	I. 1,629,744	13.3
N. Y. City & No.	218,392	202,706	I. 15,686	7.7
N. Y. Out. & W.	533.183	459,462	I. 73,721	16.0
Norfolk & West.	1,518,387	1,193,986	I. 324,401	27.1
Northern Pac.	4,268, 24	3,909,901	I. 177,803	12.4
Ohio & Miss.	1,600,401	1,422,601	I. 358,830	9.1
Ohio Southern.	232,790	192,891	I. 39,899	20 6
Oreg. R. & N. Co.	1,829,750	1,849,578	D. 19,828	1.0
Peoria, Dec. & E.	348,176	280,447	I. 67,729	24.1
Pitts. & West.	757,811	537,754	I. 220,057	40.9
Rich. & Danville.	1,691,497	1,619,465	I. 72,032	4.4
Va. Mid. Div.	603,641	564,841	I. 38,800	6.8
Chas., C. & A.	325,660	332,319	D. 6 659	2.0
Col. & Gr. Div.	224 053	282,577	D. 58,524	20 9
West. N. C. Div.	251,676	196,115	I. 55,561	28.3
Wa., O. & W.	40.800	35.300	I. 5,500	15.5
St. Jo. & Gr. I'd.	455,747	458,907	D. 3,160	.6
St. L., A. & T. H.	550,885	474,389	I. 76,496	16.1
Branches	330,453	254,595	I. 75,858	29 7
St. L., A. & Tex.	816,088	604,040	I. 212.048	35.1
St. L. & San F.	2,218,101	1,626,997	I. 591,104	36.3
St. P. & Duluth.	510,559	422,491	I. 88,068	20.8
St. P., M. & Man.	2,841,029	2,467,824	I. 373,205	15.1
Shenandoah Val.	318,789	240,921	I. 77,868	32.3
Staten I'd R. T.	252,570	229,053	I. 23,517	10.2
Texas & Pacific	2,236,297	2,095,893	I. 140,404	6.6
Tol., A. A. & N. M.	185,242	126,575	I. 58,667	38.4
Tol. & Ohio Cen.	389,653	291,276	I. 98,377	33.7
Wabash (West.)	2,397,830	2,166,929	I. 230,901	10.6
Wheeling & L. E.	283,013	215,584	I. 67,429	31.2
Wisconsin Cen.	798.733	578,838	I. 219,895	37.9
Min., S. C. & W.	192.604	85,000	I. 107,604	126 5
Wis & Minn.	345,420	70,460	I. 274,960	390.0
Total	$128,913,037	$110,346,424	I. $18,604,467	
			D. 127,854	
Net			I. $18,566,613	16.8
Three months—Jan. 1 to March 31:				
Beech Creek	$165,538			
Net earnings	88,670			
Ogden. & S. U.	108.590	$103,003	I. $5,587	5.4
Net earnings	15,590	26,861	D. 11,271	41.8
Six months—Oct. 1 to March 31:	1886-87.	1885-86.		
Hart. & Conn. W.	$166,763	$154,057	I. $12,706	8.2
Net earnings	48,207	39,844	I. 8,363	21.0

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

* Includes three weeks of May in each year.

The St. Lawrence Canals.

In the Canadian House of Commons Mr. Walter Shanly appealed to the government to introduce without delay a bill freeing the St. Lawrence canals entirely from tolls. He said the canal policy of the government hitherto had been a lamentable failure, and trade which to-day should find its outlet by the St. Lawrence was going to New York and Boston. The Minister of Finance declined to give definite assurance as to the course the government would pursue in the matter.

Sustaining the Ruling of the Commission.

Judge Pardee, of the United States Circuit Court, handed down his decision, June 21, on the application of the Receivers of the Texas & Pacific for an order relative to the application of the fourth section of the Inter-state Commerce law. It is in effect that the recent decision of the Inter-state Commerce Commission covers the grounds of the application, and the Court does not consider it advisable to make the order requested by the Receivers.

Russian Crops.

The crops in Podolia, Kieff and Bessarabia are excellent, while in Taurida, Kherson and around Odessa they are a failure. Drouth, heat, and the collapse of the Chicago ring have seriously affected the markets in the south of Russia.

The Inter-state Commission.

The Commission heard last week the complaint of the Chicago & Alton against the Pennsylvania, and the latter's answer to the same. The burden of the complaint, as explained to the Commission by Mr. Brown, in behalf of the Chicago & Alton Railroad Co., is that the Pennsylvania Railroad Co. and the Pennsylvania Co. have violated the Inter-state law in three particulars. In the first place it is alleged that the Pennsylvania Co. has refused to accord to the complainant equal facilities and advantages with other roads; in the second place it has subjected the complainant to undue disadvantage; and in the third place it is charged that the defendants have not afforded all reasonable facilities for the interchange of traffic and passengers. Therefore the complainants ask that the Pennsylvania Railroad Co. and the Pennsylvania Co. be required by the Commission to afford these facilities.

Counsel for the Pennsylvania in his argument held that a company is not bound to go beyond its own lines for the purpose of making facilities. Great emphasis was laid on the perniciousness of the commission-paying system. President Roberts appeared and spoke for his company on this subject. George R. Blanchard supported Mr. Roberts' views. Both sides got their testimony all in, and then the Commission listened to a similar complaint made by the Chicago, Rock Island & Pacific against the New York Central & Hudson River. Mr. Loomis, for the defendant, took the broad ground that his company is not bound to sell tickets for any other company. Henry Monett testified that the circular agreeing not to pay commissions had been sent to 240 railroad companies, and 219 of them had accepted the interchange proposition.

Swift & Co. and Armour & Co., of Chicago, have preferred charges of unjust discrimination against the Baltimore & Ohio, the Chicago & Grand Trunk, Indianapolis & St. Louis, Lake Shore & Michigan Southern, Chicago, St. Louis & Pittsburgh, Pittsburgh, Fort Wayne & Chicago and Michigan Central companies. It is alleged that for transportation to the East of dressed beef, sheep and hogs 35 cents per 100 pounds more is demanded than for the transportation of other meat provisions, although the conditions are the same, except that the carriers' liability is less in the first instance. The East St. Louis Dressed Beef Company, Nelson Morris & Co. and George H. Hammond & Co. also join in the above complaint.

The Commission has adopted, and directed to be sent to all railroad companies, the following order: "*Whereas*, Section 6 of the 'Act to Regulate Commerce' authorizes the Commission to direct when joint tariffs shall be made public, and to prescribe the measure of publicity to be given to the same, it is ordered as follows:

Joint tariffs of rates, fares or charges established by two or more common carriers for the transportation of passengers or freight, passing over continuous lines or routes, copies of which are required by the sixth section of the "Act to Regulate Commerce" to be filed with the Commission, shall be made public so far as the same relate to business between points which are connected by the line of any single common carrier required by the first paragraph of said section to make public schedules of its rates, fares and charges. Such joint tariffs shall be so published by plainly printing the same in large type of at least the size of ordinary pica, copies of which shall be kept for the use of the public in such places and in such form that they can be conveniently inspected at every depot or station upon the line of the carriers uniting in such joint tariff where any business is transacted in competition with the business of a carrier whose schedules are required by law to be made public as aforesaid.

Arguments by the Burton Stock Car Co. were heard this week. The complaint alleges that the companies charge shippers an excess of one hundred and thirty-eight per cent. for the privilege of shipping cattle in the Burton cars. Their prayer is that the companies be restrained from such discrimination and overcharge.

Subsidized Steamers between Canada and France.

A subsidy of $50,000 annually is to be granted by the Dominion government for a line of steamers between France and Canada. The route is to be to the St. Lawrence River in summer and to Halifax in winter, with liberty to touch at a point in the United States, provided the service be made directly from Halifax. The trips during the first two years are to be one trip every 20 days during the navigation of the St. Lawrence, and a trip every month during the winter season, and during the remainder of the service the trips are to be fortnightly. The government reserves the right to cancel the contract at the end of two years without assigning reasons, or at any time during the term, providing there is a failure in any way to carry out the contract.

Rates for the National Educational Association.

For the meeting of the National Educational Association at Chicago, July 12, all lines in the Western States Passengers' Association and Central Traffic Association will carry persons to Chicago from July 5 to July 12 and return them until Sept. 10 at one fare for the round trip, plus $2. Tickets can be purchased by teachers and members of teachers families, by editors and reporters of educational journals on application to local agents. The lines of the Trunk Line Association and the Southern Passenger Association will carry persons to Chicago from July 5 to July 12 at full fare on certificates furnished by J. H. Canfield, Lawrence, Kan., and W. D. Parker, Palmer House, Chicago, and return them at one-third fare.

East-bound Rates from Milwaukee.

The Chicago committee of east-bound freight traffic and the general freight agents of the roads running east from Milwaukee, have adopted the following agreement for basing rates on east-bound traffic from Milwaukee: The allowance to the St. Paul and Northwestern Railways to and from Milwaukee and intermediate points between Chicago and Milwaukee shall be as follows, based on short-line mileage from Chicago: Albany, Troy, Schenectady, Philadelphia, Baltimore and Washington, 11 per cent. of the through rate; New York, 10 per cent.; Buffalo, Suspension Bridge, Black Rock and Salamanca, 16 per cent.; Boston, 9 per cent.; Portland, 8 per cent.; Pittsburgh, Bellaire and Wheeling, 17½ per cent.; east of Buffalo to Rochester, 13 per cent.; east of Rochester to Syracuse, inclusive, 12 per cent.; east of Syracuse to Albany, inclusive, 11 per cent. Recognized terminals and arbitraries at eastern points, as shown by the line handbooks, to be deducted before prorating to or from Milwaukee and intermediate points.

Percentages now in effect by all lines from Milwaukee to be corrected to correspond with the foregoing allowances, and to take effect Juiy 1.

The Length of Live Stock Cars.

The Union Pacific and some other roads west of the Missouri River are accused by the Iowa roads of having cut the rate on live stock in car loads by taking 34 ft. cars at the tariff rates for car loads, which has always been understood to mean cars 30 ft. long. At a meeting in Chicago last week the Nebraska roads agreed to abandon this irregular rate. Some irregularities in grain rates from Nebraska points were also straightened at this meeting.